Bi-Annual Construction Monitoring Report- December 2022- June 2023

SMWSTCTP-AFJ-1NL-EN-RPT-000023 Revision 02

Sydney Metro West – Central Tunnelling Package

DOCUMENT APPROVAL

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Revision History

Rev:	Date:	Pages:	By:	Description:
00	17/08/2023	All	[redacted]	Preparation of Bi-annual monitoring report
01	31/10/2023	All	[redacted]	Updated to address comments from SM, AA and ER
02	20/03/2024	Various	[redacted]	Updated to Address AA and ER comments

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COMPLIANCE MATRIX

Condition Reference	Condition Requirement	Reference
C14	The following **Construction Monitoring Programs** must be prepared in consultation with the relevant government agencies identified for each to compare actual performance of construction of Stage 1 of the CSSI against the performance predicted in the documents listed in **Condition A1** of this schedule or in the **CEMP**: (a) Noise and vibration Monitoring program; consult with EPA, SOPA (in respect of Sydney Olympic Park), Place Management NSW (in respect of The Bays) and Relevant Council(s) (b) Blasting Monitoring program; consult with SOPA (in respect of Sydney Olympic Park), Place Management NSW (in respect of The Bays) and Relevant Council(s) (c) Surface water quality Monitoring program; consult with DPE Water, Relevant Council(s) and Sydney Water (if any Sydney Water assets are impacted) (d) Groundwater Monitoring program; consult with DPE Water and SOPA (in respect of Sydney Olympic Park) Note: The Blasting Construction Monitoring Program is only required to be prepared if blasting is proposed to be conducted during construction.	Section 3 of the Surface Water Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PRG-000001) Section 3 of the Groundwater Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PLN-000006)
C15	Each **Construction Monitoring Program** must provide: (a) details of baseline data available including the period of baseline monitoring; (b) details of baseline data to be obtained and when; (c) details of all monitoring of the project to be undertaken; (d) the parameters of the project to be monitored; (e) the frequency of monitoring to be undertaken; (f) the location of monitoring; (g) the reporting of monitoring results and analysis results against relevant criteria; (h) details of the methods that will be used to analyse the monitoring data; (i) procedures to identify and implement additional mitigation measures where the results of the monitoring indicated unacceptable project impacts; (j) a consideration of SMART principles; and (k) any consultation to be undertaken in relation to the monitoring programs; and (l) any specific requirements as required by Conditions C16 to C17 of this schedule.	Section 3 of the Noise and Vibration Monitoring Program (SMWSTCTP-AFJ-1NL-NV-PLN-000001) Section 3 of the Surface Water Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PRG-000001) Section 3 of the Groundwater Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PLN-000006)
C16	The **Noise and Vibration Construction Monitoring Program** and **Blasting Construction Monitoring Program** must include: (a) noise and vibration monitoring determined in consultation with the AA to confirm the best-achievable construction noise and vibration levels with consideration of all reasonable and feasible mitigation and management measures that will be implemented; (b) for the purposes of (a), noise monitoring must be undertaken during the day, evening and night-time periods and within the first month of work as well as throughout the construction period and cover the range of activities being undertaken at the sites; and (c) a process to undertake real time noise and vibration monitoring. The results of the monitoring must be readily available to the construction team, the Proponent, ER and AA. The Planning Secretary and EPA must be provided with access to the results on request.	Section 3 of the Noise and Vibration Monitoring Program (SMWSTCTP-AFJ-1NL-NV-PLN-000001)

C17	**Groundwater Construction Monitoring Program** must include: (a) groundwater monitoring networks at each construction excavation site; (b) detail of the location of all monitoring bores with nested sites to monitor both shallow and deep groundwater levels and quality; (c) define the location of saltwater interception monitoring where sentinel groundwater monitoring bores will be installed between the saline sources of the estuary or river and that of the stations or shafts; (d) results from existing monitoring bores; (e) monitoring and gauging of groundwater inflow to the excavations, appropriate trigger action response plan for all predicted groundwater impacts upon each noted neighbouring groundwater system component for each excavation construction site; (f) trigger levels for groundwater quality, salinity and groundwater drawdown in monitoring bores and / or other groundwater users; (g) daily measurement of the amount of water discharged from the water treatment plants; (h) water quality testing of the water discharged from treatment plants; (i) management and mitigation measures and criteria; (j) groundwater inflow to the excavations to enable a full accounting of the groundwater take from the Sydney Basin Central Groundwater Source; and (k) reporting of groundwater gauging at excavations, groundwater monitoring, groundwater trigger events and action responses; and (l) methods for providing the data collected to Sydney Water where discharges are directed to their assets.	Section 3 of the Groundwater Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PLN-000006)
C23	The results of the **Construction Monitoring Programs** must be submitted to the Planning Secretary, **ER** and relevant regulatory agencies, for information in the form of a **Construction Monitoring Report** at the frequency identified in the relevant **Construction Monitoring Program**. Note: Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	This Report

1. INTRODUCTION

This bi-annual monitoring report (B-ACMR) has been prepared to address the Condition of Approval (CoA) C23 of the planning approval for Sydney Metro West – Concept and Stage 1. The B-ACMR presents monitoring data for the reporting period for all works undertaken on the Sydney Metro West Central Tunnelling Package (CTP) from 21st December 2022 to 30th June 2023. This is the third B-ACMR prepared for the CTP.

This report will present results from the construction phase of the monitoring programs and compare the results against established baseline data where available. There is a large amount of noise and vibration data from the unattended monitors, examples of data have been provided to demonstrate the monitoring which occurred during the period. Ground water and surface water data will be provided in full. This report will primarily highlight and discuss exceedances of the required criteria the other results demonstrate compliance.

In accordance with each Construction Monitoring Program, the data will be made available to relevant authorities within 40 business days of the ending of the monitoring period.

2. NOISE AND VIBRATION

The Noise and Vibration Monitoring Program (NVMP) aims to identify the potential impacts of the CTP works on noise and vibration within the local environments surrounding the construction sites. The data presented in the B-ACMR is prepared in accordance with CoA 16 and 23 of the project Planning Approval, which requires reporting the results of CTP works to the Planning Secretary, ER and relevant regulatory agencies.

The report details the results of the construction phase of the NVMP. This report will compare the noise and vibration criteria against monitoring data recorded during the reporting period.

2.1 MONITORING LOCATIONS

2.1.1 ATTENDED MONITORING

Attended noise monitoring was completed using a handheld sound level meter fixed to a tripod. Noise monitoring was completed as required, generally for verification purposes for noise impacts associated with the Out of Hours Works (OOHW) and to confirm the SWL for plant being used during daytime hours. Attended monitoring results are provided in Appendix A. The LAeq noise levels captured by these monitors include both construction related activities and extraneous noise sources.

Please note that the duration of each monitoring event is 15 minutes unless stated otherwise. On occasion shorter durations of noise monitoring was conducted at source point locations.

One attended vibration monitoring event occurred during the reporting period at Burwood North southern site during a trial with a roller and excavator.

Note, low number of monitoring can be attributed to a reduced OOHW from March 2023 to June 2023.

2.1.2 UNATTENDED MONITORING

Unattended noise and vibration monitoring is completed on a continuous basis using noise and vibration loggers deployed at each of the CTP construction sites to obtain real time data as per CoA C16c. The unattended monitoring locations are identified in Appendix A.

Examples of unattended noise monitoring data for Five Dock, Burwood North, North Strathfield, Sydney Olympic Park and The Bays are provided in Appendix A. Several examples of real time monitoring set-ups for unattended noise are also provided in Appendix A.

Note, the unattended noise monitor at Five Dock west was relocated approximately 10 m along the boundary of the sensitive receiver on 26 May 2023 to a more representative location.

2.2 NOISE AND VIBRATION MONITORING RESULTS

2.2.3 ATTENDED NOISE AND VIBRATION MONITORING

During this period, 48 attended noise monitoring events were conducted at different locations near the construction sites. Of these events, several exceedances of the NML and/or predicted noise levels were recorded. In many cases non-construction-related activities were attributed to the exceedance. A non-compliance was identified and reported for ventilation noise at Five Dock on 6th June 2023. Additional mitigation measures have been implemented to reduce noise from the ventilation systems and further trials were conducted. Ventilation vans are required for the tunnelling process and generally not subject to NML compliance, AFJV has attempted to reduce the noise levels of the fans in order to minimise impact on the local community. A summary of attended noise results is provided in Appendix A.

On 10th May 2023 attended vibration monitoring was undertaken to understand potential sources of vibration from works being undertaken on the southern shaft at the Burwood North southern site. The monitoring event was a trial during use of a remote roller and 20T excavator. As part of a trial, one vibration spike was recorded

when the excavator bucket purposely contacted the concrete blinding, to determine potential vibration impact from associated work. No exceedances were recorded during use of the remote roller. Vibration monitoring will continue to ensure works are being undertaken in accordance with the relevant vibration criteria and potential safe working distances. A detailed summary of this vibration monitoring trial is provided in Appendix B

2.2.4 UNATTENDED NOISE AND VIBRATION MONITORING

Unattended monitoring was undertaken at the locations in Appendix A. The following discusses examples of monitoring undertaken during the reporting period.

As the two tunnel boring machines (TBM) TBM 3 and TBM 4 launched at The Bays on 21st April and 12th May 2023 respectively and progressed under the White Bay Power Station (WBPS), (which was considered one of the high risks from a vibration perspective on the project), the three vibration monitors: WBPS_1 (East Boundary), WBPS_2 (Ground floor) and WBPS_3 (Upper floor); located at the WBPS monitored vibration and the data was reviewed regularly. As WBPS contains heritage buildings, DIN4150 standard was used to assess potential impacts. To evaluate the effects of long term (or harmonic) vibration on structures, the lowest criterion of 2.5mm/s peak particle velocity (PPV) in DIN4150 is often referred to. The WBPS is considered to be structurally sound but conservative criteria of 2.5 mm/s was applied in the vibration threshold as a risk management approach. Exceeding 2.5mm/s does is not an indication that potential damage has or will occur.

A spike of 8.55mm/s was observed on 9th May 2023, where the frequency was 256 Hz which is outside the typical frequency expected for a TBM. This was likely caused by impact from a labour working on the restoration of the WPBS in close proximity to the vibration unit. A spike of 2.85mm/s was observed on 16th May 2023 at WBPS_3 but the frequency for this event was 108-228Hz which is outside the typical frequency expected for a TBM. Additionally, the spike occurred when the TBM was greater than 50m from the geophone and the results did not increase as the TBM approached. Another spike of 3.5mm/s was observed on 8th June 2023 and as confirmed by the engineers the TBM was not working that day. The spike was more likely to have been caused by a movement in proximity to the geophone. While the TBMs were under the WBPS results were reported to Sydney Metro on a weekly basis. A report is provided in Appendix B.

Prior to the TBM working under the WBPS, vibration spikes of 3.5mm/s, 6.25mm/s, 435 mm/s and 17.9mm/s were observed on 28th February 8th March and 20th April 2023 respectively for the vibration monitors at WBPS. These spikes were due to device changeout by AFJV environmental resources rather than construction related.

Vibration exceedances were identified at [redacted]Burwood (retail building) adjacent to the Burwood North southern site during January and March 2023. The activities occurring were related to site demolition and exposure of piles. In each case the workers were contacted after an automated text message was received from the vibration logger. Upon contact, work ceased immediately and an investigation was undertaken. Where possible methodology was changed and further monitoring undertaken. Each event was an isolated peak and no further exceedances for that activity were recorded. Given the frequency (Hz) of the events the PPV is unlikely to have caused cosmetic damage. Refer to Appendix B for more detail.

Noise exceedances were identified at the unattended monitoring site [redacted]at Burwood North on 21st February 9th March, and 16th March 2023. An exceedance of predicted noise level was recorded on 21 February 2023 during utilities work and a similar activity occurred under the same out of hours work permit on 6 February 2023 which recorded a noise level below predicted. Exceedances of predicted noise level were recorded also recorded for 9 March and 16 March during plant delivery and hoarding removal respectively. As these results were from unattended monitoring the noise sources are unclear. AFJV will continue to undertake attended noise monitoring during similar activities to determine noise sources and cause of the exceedance.

2.3 NOISE AND VIBRATION COMPLAINTS

There were several complaints received from the community regarding noise at each site. Complaints were addressed by the community team and preventive actions were taken. Reasonable and feasible mitigation measures were provided to minimise the impacts on the affected community members. The

recommendations were implemented in consultation with the community and stakeholders through facilitation by the community team.

Examples of monitoring associated with complaints include:

- Noise complaints were received on 9, 13 and 14 February 2023 at Five Dock. In response to these complaints, attended noise monitoring was completed on 13 and 14 February for the ongoing utilities OOHW causing the impact. The work was determined to be below the predicted noise level.
- A noise complaint was received on 13 April 2023 at Five Dock and attended noise monitoring was completed on 17 April 2023 which showed the dominant noise was not construction related.

Along with the monitoring, alternative accommodation was offered to highly impacted receivers, high noise impact works are completed by 12am, noise mats are used where possible, and the substitution of plant has occurred to minimise impact.

2.4 CONCLUSION

Attended and unattended monitoring has occurred throughout the reporting period at each CTP site. The monitoring was for various purposes including compliance, plant tests and verification of out of hours work impacts.

From the attended noise monitoring, one non-compliance was identified at Five Dock for ventilation fans required for tunnelling on 6 June 2023. Additional mitigation measures have been implemented to reduce noise from the ventilation systems and further trials were conducted. Other exceedances for attended noise monitoring were considered compliant. Unattended monitoring identified three exceedances but the noise sources were unverified.

Exceedances reported for vibration at White Bay Power Station were not related to AFJV works. Monitoring undertaken at Burwood North Southern site identified exceedances, as isolated spikes, related to construction activities but revised methodology was implemented and no further exceedances were recorded for those activities. Given the frequency (Hz) of the events the PPV is unlikely to have caused cosmetic damage.

AFJV will continue to undertake monitoring and implement reasonable and feasible mitigation measures to reduce potential noise and vibration impacts.

3. SURFACE WATER

The purpose of the Surface Water Monitoring Program (SWMP) is to identify the potential impacts of the CTP works on water quality within local receiving waters. The data presented in the B-ACMR is submitted in accordance with Condition C23 of the Project Planning Approval which requires reporting the results of the CTP works to the Planning Secretary, ER and relevant regulatory agencies.

The report is to provide monitoring data and analysis of results as required to be generated in SWMP. The report details the results during the construction phase of the SWMP. This report will compare the baseline water quality against monitoring data undertaken during the reporting period.

3.1 MONITORING SITES

During the reporting period, surface water quality monitoring was undertaken for dry and wet weather conditions in accordance with SWMP monitoring program. Table 3-A Surface water quality monitoring locations provide a summary of the monitoring locations, and the monitoring location map is included in Appendix D.

Surface water quality was measured at eight locations during the reporting period. Monitoring locations were identified as being representative of the surrounding receiving waters and sufficient to identify potential project

impacts should there be any quality exceedances.

Table 3-A SURFACE WATER MONITORING LOCATIONS

Name	Waterway	Nearest Project Site	Location	Distance From Site to Creek
WB-D/S	White Bay	The Bays	-33.866245°S, 151.180450° E	Immediately adjacent to the site
DC-U/S	Dobroyd Canal / Iron Cove Creek	Five Dock	-33.873828 ° S, 151.128243° E	600m
DC-D/S	Dobroyd Canal / Iron Cove Creek	Five Dock	-33.870604° S, 151.141474° E	600m
SLP-D/S	St Lukes Park Canal	Burwood North	-33.861571°S , 151.113347° E	230m
PC-U/S	Powells Creek	North Strathfield	-33.862145°S, 151.086294° E	350m
PC-D/S	Powells Creek	North Strathfield	-33.852589°S, 151.082359° E	350m
SC-D/S	Saleyards Creek	Sydney Olympic Park	-33.852282°S, 151.081934° E	1km
HC-D/S	Haslams Creek	Sydney Olympic Park	-33.834564°S, 151.075772° E	1km

3.2 SURFACE WATER QUALITY CRITERIA

The surface water quality results were compared based on the ANZECC guideline. No detailed pre-project baseline surface water monitoring data was identified in the Sydney Metro West EIS documentation. Monitoring data collected from other projects has been used as background data as presented in Table 3-B. The data collected provides insight into the general health of the waterway. As per the review of existing water quality data collected, some background levels exceed the ANZECC guidelines (2000). The surface water monitoring results for this reporting period have been compared to the pre-existing water quality in Table 3-B.

Table 3-B- PRE-EXISTING WATER QUALITY DATA BASED ON ANZECC GUIDELINES

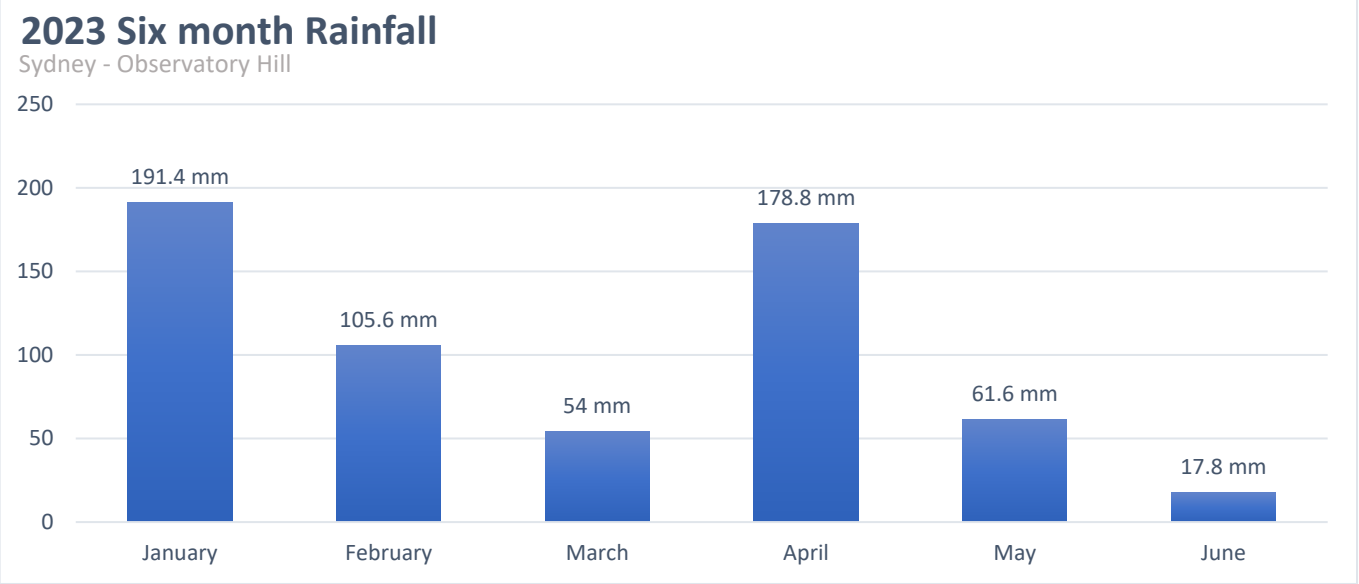
Parameter	ANZECC Guideline [1]	Sal1 (U/S)[3] – Salesyard creek	Sal2 (D/S)[3]- Salesyard creek	Pow1 (U/S)[3] - Powells Creek	Pow2 (D/S)[3] - Powells Creek	SLP2 (D/S)[3] -St Lukes Park Canal	Bar2 (D/S)[3] - Barnwell Park Canal	Dob1 (U/S)[3] - Dobroyd Canal	Dob2 (D/S)[3] - Dobroyd Canal	SW09 Dobroyd Canal[4]	SW01 Rozelle Bay[5]
pH	7.0 – 8.5 [2]	7.8-9.4	7.5-9.1	7.6-9.5	7.7-9.9	7.8-9.7	7.1-8.2	8.1-9.1	7.0-9.1	7.0 – 8.5	5.6-8.0
Conductivity (uS/cm)	Lowland rivers: 125–2200 µS/cm	126-3744	203-40,823	99-2977	101-36,323	165-4,535	258-30,752	230-1718	260-52,630	42 average	403-541,180
DO (mg/L)	N/a	8.8-15	5.4-14	6.9-13	6.8-16	8.2-14	4.7-10.8	9.0-13	4.4-15	n/a	-0.16-558
DO (%sat)	85-110	107-151	67-151	89-130	75-168	96-161	56-110	106-132	58-159	n/a	n/a
Turbidity (ntu)	0.5 – 10 [2]	0-138	5-101	4-501	2-444	0-364	6-48	11-549	2.5-187	n/a	0-52
Oil and grease	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Notes: 1 – ANZECC (2000) – slightly to moderately disturbed aquatic ecosystems, 2 – Guideline value for SE Australian estuaries 3 - Appendix R of the M4 East project EIS 4- WestConnex M4-M5 Link Mainline Tunnels Soil and Surface Water Management Sub-Plan 5- WestConnex Rozelle Interchange Project Soil and Surface Water Management Plan

3.4 RAINFALL DATA

During the reporting period 609.2 mm of rainfall was received at Observatory Hill with the highest rainfall received in January 2023 and lowest in June 2023 as presented in Figure 3-A.

Figure 3-A- Rainfall statistics



Due to reduced rainfall in March and May 2023 some of the ephemeral waterways were dry and surface water sampling could not be conducted.

3.3 SURFACE WATER QUALITY RESULTS

A review of the existing water quality data collected for the project, undertaken in the EIS, states that the watercourses relevant to the CTP existed in poor condition prior to the project commencement and are representative of a heavily urbanised system. In this monitoring round minor exceedances in Dissolved Oxygen and Turbidity were found compared with preconstruction values portrayed in table 3-B. Given that multiple sources of potential impact exist along the corridor in a densely populated urban area, exceedances (compared to pre-existing water quality data or ANZECC 2000 guidelines) in surface water quality are not determined to be attributable to project work. The data, presented in Appendix C, suggests there are no additional impacts to the surrounding waterways from the project.

3.4 FIELD OBSERVATIONS

During sampling no odours were noted. Also, no visual sign of contamination was observed (oil and grease) or turbidity attributed to the AFJV construction activities. Refer to Appendix C for a detailed summary of pH, EC (Electrical Conductivity), dissolved oxygen, redox and turbidity for each surface water location sampled during the monitoring period.

3.5 CONCLUSION

A review of the existing water quality data collected from Sydney Metro, Local Councils, University of Western Sydney, and WestConne4x M4 East project undertaken as part of the EIS, indicated that some of the background levels exceeded the ANZECC (2000) water quality trigger values. The watercourses were identified to be slightly to moderately disturbed ecosystems. Therefore, exceedances in water quality results are not attributable to the project. Comparing the pre-existing data with the obtained results, these fall within expected ranges and no identified negative impacts have been caused by the project.

4. GROUNDWATER

The purpose of the Groundwater Monitoring Program (GWMP) is to identify the potential impacts of the CTP works on the groundwater quality of the local environments. The data presented in the B-ACMR is prepared in accordance with condition C17 and C23 of the Project Planning Approval, which requires reporting the results of the CTP works to the Planning Secretary, ER and other relevant regulatory agencies.

This report details the results during the construction phase of the GWMP for the Bays, Five Dock, Burwood North, Sydney Olympic Park and North Strathfield. Piling started at North Strathfield on 9th November 2022 and monitoring of the groundwater was conducted from March 2023 onwards. A bladder pump and a plastic bailer was used to sample water from the monitoring wells at North Strathfield after a month of commencement of piling but was unsuccessful in retrieving water from the wells. Monitoring at North Strathfield was thereby conducted monthly for three months, following that period the site will be monitored on a quarterly basis.

Groundwater has been treated by water treatment plants (WTP) at The Bays, Burwood North, Sydney Olympic Park and Five Dock sites during this monitoring period. The influx of groundwater in the sites is highly dependent on rainfall as greater ingress is observed during higher rainfall. Since the surface water and ground water is treated through single water treatment plants at each site, the numerous variables, including sprinkler systems utilised for dust suppression, makes calculating the specific amount of groundwater ingress for each site extremely difficult.

4.1 GROUNDWATER MONITORING LOCATIONS

In accordance with the GWMP, there are 33 boreholes identified throughout the project to monitor and sample. However, some boreholes required removal during construction due to construction activities occurring in that location. Section 7.1 of the CEMP specifies monitoring monthly for the first three months of construction and quarterly thereafter. Borehole locations utilised during the reporting period are summarised in Appendix D.

Refer to Table 4-A for a summary of monitoring completed within the reporting period.

Table 4-A- GROUNDWATER MONITORING PERIOD

Site	Ground Disturbance Trigger Date	Construction Monitoring (first 3 months of construction)	Quarterly Monitoring
The Bays	05/04/2022	Round 1: 05/05/2022 Round 2: 25/5/2022 Round 3: 21/06/2022	Round 1: 19/09/2022 Round 2:12/12/2022 Round 3: 21/03/2023
Five Dock	23/05/2022	Round 1: 21/06/2022 Round 2:18/07/2022 Round 3: 29/08/2022	Round 1: 21/11/2022 Round 2: 22/02/2023 Round 3: Conducted in June
Burwood North	1/06/2022	Round 1: 21/06/2022 Round 2: 18/07/2022 Round 3: 29/08/2022	Round 1: 21/11/2022 Round 2: 27/03/2023 Round 3: Conducted in June
North Strathfield	09/11/2022	Round 1: 21/03/2023 Round 2: 27/04/2023 Round 3: 30/05/2023 Refer to sectio9n 4.2.3	Round 1- Scheduled for August 2023
Sydney Olympic Park	21/06/2022	Round 1: 18/07/2022 Round 2: 29/08/2022 Round 3: 19/09/2022	Round 1: 12/12/2022 Round 2: 21/03/2023

4.2 FIELD INVESTIGATION

4.2.1 GROUNDWATER MONITORING METHODOLOGY

To ensure accurate results, the methodology outlined in the Groundwater Monitoring Program for gauging and collecting samples during the monitoring rounds was followed. In cases where it was not possible to pump water out of the boreholes due to lack of water or space restrictions on site (for example, physically unable to place equipment), a bailer was used to collect samples. Detailed monitoring methodology is appended in Appendix D.

4.2.2 GROUNDWATER SAMPLING AND GAUGING

Groundwater sampling and gauging was conducted at accessible groundwater monitoring wells. Table 4-B outlines the boreholes that were sampled during the monitoring period.

Table 4-B Groundwater Wells Monitored

Site	Borehole number	Quarterly Monitoring 1	Quarterly Monitoring 2	Quarterly Monitoring3
The Bays	S02d	Sampled	Sampled	Sampled
	S06	Sampled	Sampled	Sampled
	S58d	Sampled	Not sampled	Sampled
	S58s	Sampled	Sampled	Sampled
	S55	Sampled	sampled	Sampled
	S40d	Sampled	Not sampled	Not sampled
	S40s	gauged	Not sampled	Not sampled
	AF_CGW1	gauged	Not sampled	Not sampled
	S54	Sampled	Sampled	Not sampled
Sydney Olympic Park	SMW_BH019	Not sampled	Not sampled	-
	SMW_BH120	Sampled	Sampled	-
	SMW_BH068	Sampled	Sampled	-
	SMW_BH126	Sampled	Sampled	-
Tunnel NW of SOP	SMW_BH121	Sampled	Sampled	-
Tunnel SOP-NS	BH715B	Sampled	Sampled	-
	AF_BH36	Not sampled	Not Sampled	-
Burwood	BH046R	Not sampled	Not sampled	-
	BH044	Not sampled	Not sampled	-

Five Dock	BH051	Sampled	Sampled	-
North Strathfield	SMW-BH035s	Sampled	Sampled	Sampled
	SMW_BH009	Sampled	Sampled	Sampled
	SMW_BH009s	Sampled	Sampled	Sampled
	SMW_BH035	Sampled	Sampled	Sampled
	SMW_BH038	Sampled	Sampled	Sampled

Refer to Appendix D for detailed description of the monitoring conducted. Sampling dates are specified in table 4-A.

4.2.3 GROUNDWATER MONITORING WELL STATUS

The groundwater monitoring wells that could not be accessed, replaced, or sampled during this monitoring period are listed in Table 4-C.

Table 4-C Explanation of groundwater wells not monitored.

Month	Site	Borehole number	Comments
March	Sydney Olympic Park	BH032, BH032s	The borehole is located on private property. Could not get access in December and March. The resident would not provide access to the property. Access was provided in June.
March	Sydney Olympic Park	BH019	The borehole couldn't be located. The existing borehole is in a field where the grass had not been mowed. Despite searching for the borehole, it was unable to be located. Further investigation will be carried out to see if the borehole was damaged in some way.
March	The Bays	AF_CGW1	The borehole is located near the T-WTP at the bays. The borehole couldn't be monitored before due to excessive sediment deposits from rainfall. This restricted the ability to extend the pump to the bottom of the borehole. The sediment was cleaned up but there was no water in the well.
March	The Bays	S40_d, S40_s	The borehole couldn't be monitored, as the casing was

			bent making it impossible to feed the pump/bailer through the casing. The area where these boreholes are located has been handover to ETP.
March	Burwood North	BH046R	This borehole couldn't be sampled as it is inside the site and construction was on going and the access was restricted. Access was obtained and sampling was done in the month of June.
March	Burwood North	BH044	As the borehole is in a parking spot access could not be availed as cars were consistently parked over the top of the boreholes. Access was obtained in the month of June 2023, which is the next monitoring round, where traffic control was involved to move the car out of the way.

A consultant was engaged to provide input as to the potential cause of water not being able to be retrieved from the wells at North Strathfield. The potential causes and solution provided by the consultant for being unable to retrieve water from the monitoring wells after piling commenced are:

i. Bladder pump was not working as there may be insufficient water to push water to the surface, and the possible solution provided was to use a bailer.

Even after using a disposable bailer, no water was retrieved, and the potential cause suggested was:

ii. The bailer could not reach the depth where groundwater was intercepted, which might be due to friction on the side walls due to silt/clay smearing, stopping the bailer from reaching the groundwater.

Hence, a stainless-steel bailer was used to overcome the sidewall friction.

4.2.4 FIELD OBSERVATIONS

During sampling and gauging, no odours were noted. Also, no visual sign of contamination (such as a sheen) was observed. Refer to Appendix D for a detailed summary of pH and EC (Electrical Conductivity) dissolved oxygen, redox, turbidity, EC (Electrical Conductivity) for each borehole sampled during the monitoring period.

4.3 TRIGGER VALUES

A set of trigger values has been developed on a site-by-site basis. This has been done following these steps:

- If result below LOR (Limit of reporting), the trigger value is set at:
  - LOR x 10 (if LOR is more than 10x > screening levels);
  - LOR (if LOR is less than 10x screening levels)
- For result with detects:
  - If data does not support statistics applied maximum plus 20%, also note where the maximum already exceeds screening levels (The 20% represents the standard field/lab error we apply in normal QA/QC (Quality Assurance/Quality Control)).

If there is an exceedance of a Trigger Value, the following next steps may be considered:

- Review Site data for the well with the exceedance

- Data for that well should be tracked for long-term trends after the next sampling period;
- If the next sampling round also exceeds, increased frequency of sampling is warranted to evaluate the longer-term trend; and
- If increasing trends are identified, further site-specific assessment should be conducted that can include review of hydrogeologic information, trends and as well as assessment of risks to quality of water.

4.3.1 LABORATORY RESULTS ANALYSIS

The results obtained from the laboratory from groundwater sampling were compared with the trigger levels adopted to assess groundwater characteristics and no exceedances were identified in the undertaken groundwater samplings of 2023.

Summary of the monitoring well locations along the alignment and trigger values are provided in Appendix D.

4.4 GROUNDWATER LEVELS

During the reporting period, groundwater levels in borehole tunnel alignment and adjacent to construction sites showed minimal variance. Rainfall has a nearly direct correlation with the levels of water observed in the boreholes during the sampling period. Increased periods of rain fall show increased amounts of water in each bore with the levels tapering off as rainfall decreases. It does not appear from the data that construction activities have impacted groundwater as the values remain consistent throughout this monitoring period. Refer to Appendix E for a summary of all groundwater level data compiled during the reporting period. Apart from the data gathered during the field investigations, live dataloggers are installed in different boreholes across the areas around station boxes and tunnel alignment. This data is monitored by engineers to assess if drawdowns are within the expected value, which they confirmed in the last consultation. Table 4-D shows the boreholes that possess live dataloggers.

Table 4-D Live datalogger boreholes

LIVE DATALOGGER BOREHOLES				
THE BAYS	**FIVE DOCK**	**BURWOOD**	**NORTH STRATHFIELD**	**SYDNEY OLYMPIC PARK**
AF_BH07_W	SMW_BH050_w	SMW_BH046s	SMW_BH009_s	SMW_BH120_W
AF_BH07S_W	SMW_BH051_s	SMW_BH046w	SMW_BH009_w	SMW_BH019_W
AF_BH44_W	SMW_BH051_w	SMW_BH1326	SMW_BH035_s	SMW_BH032_S
AF_BH51.04	R248_3103_BH141A	BH714_s	SMW_BH035_w	SMW_BH032_W
AF_BH51.11		BH714_w	SMW_BH038_w	SMW_BH068
AF_BH51.18				SMW_BH068S
AF_BH51.34				
AFCGW2-1				
AFCGW7M				
AFCGW9				
AFCGW11				
SMW_BH724				
S58_d				

The Project EIS identified a GDE (terrestrial vegetation) Turpentine – Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion Plant Community Type (PCT 1281) in proximity to the Five Dock construction site (approximately 350 metres to the east). This PCT Is considered to have a moderate to high likelihood to be terrestrial GDEs. The drawn down in the watertable at Five Dock was within the expected tolerance and no anticipated impact on the GDE is likely to have occurred. There has been little to no water ingress into the excavations at Five Dock so it is unlikely that any drawdown would be associated with AFJV works.

4.5 WATER TREATMENT PLANTS

Water treatment plant monitoring has been undertaken following the stipulated frequency in condition E2.1 and condition M2.2 of the project's EPL:

i) Daily on the first 3 days of discharges,
ii) Weekly for the first month of discharges,
iii) Fortnightly for the first 3 months,
iv) Monthly for the rest of the WTPs operation. (Condition M2.2 of the EPL)

Within 10 business days of each sample results being taken a Performance report must be submitted to the EPA.

In the period from January to June 2023, four (4) Construction Water Treatment Plants were set up and commissioned at The Bays, Burwood North, Sydney Olympic Park and Five Dock. Refer to Appendix E for results in the sampling rounds of each of the WTP's.

As part of the ongoing performance improvement, some elevated concentrations have been found in the initial sampling rounds for some analytes. Examples of exceedances are provided in Table 4-E along with corrective actions taken to improve water quality. Refer to Appendix E for exceedance levels.

Table 4-E corrective actions for WTP elevated concentrations

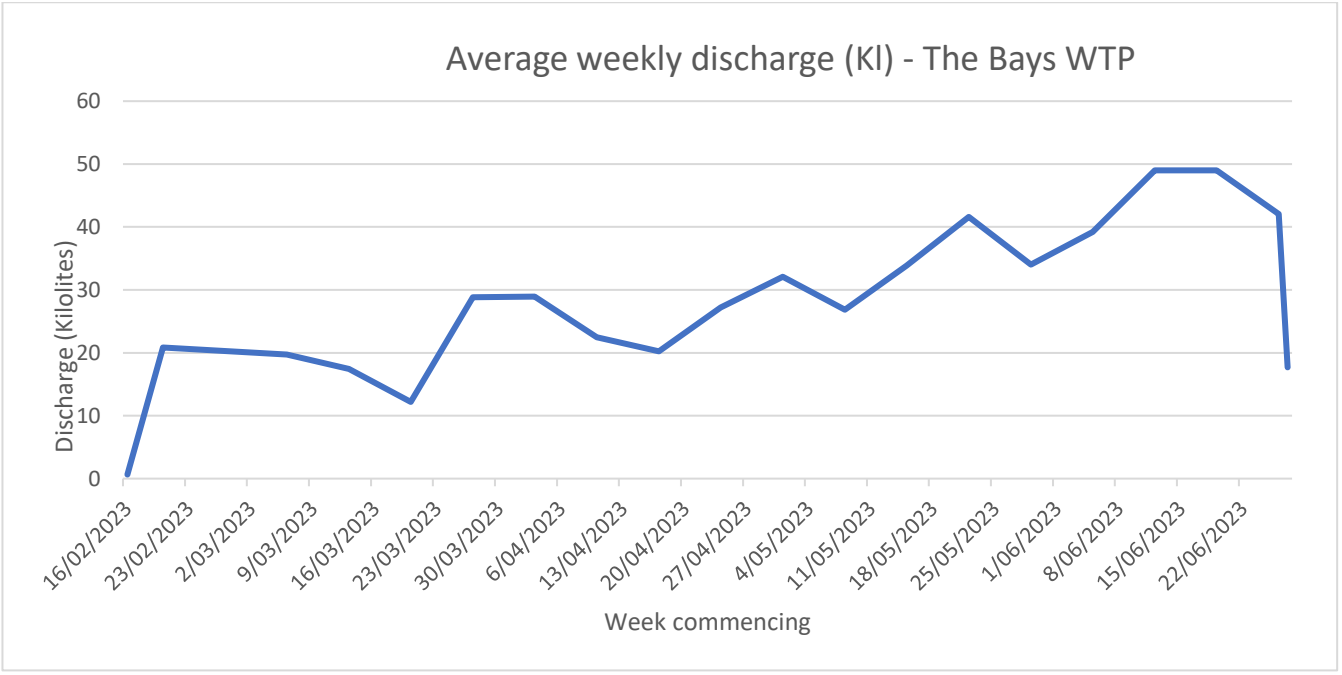
Site	Analyte	Corrective action for elevated concentration
The Bays	TSS	Additional fish tanks and devices to capture solids prior to entering WTP have been installed.
	Hydrocarbons	As part of the ongoing performance improvement, measures are in place to treat the elevated values and proceed to backwash the activated carbon filters to try to move the captured hydrocarbons to the feed of the plant for reprocessing.
	Nitrate + nitrate	Additional backwashing of media vessels and monitoring
	Nitrogen total	
	Phosphorus total	
Burwood North	Hydrocarbons	As part of the ongoing performance improvement, measures are in place to treat the elevated values and proceed to backwash the activated carbon filters to try to move the captured hydrocarbons to the feed of the plant for reprocessing.
	Chromium IV compounds	Additional backwashing of media vessels and monitoring
	Aluminium	
	Manganese	
	Nitrogen total	Flush system of excess ammonia to allow chlorine to achieve breakpoint resulting in less exceedances of total nitrogen.
	Phosphorus total	Additional backwashing of media vessels and monitoring
	Ammonia	
Five Dock	Nitrogen total	Running raw water through a settlement tank to reduce solids entering the WTP feed has been undertaken. A lamella tank and fishpond will be placed in the shaft to further reduce solids entering the WTP.
	Phosphorus total	
Sydney Olympic Park	pH	Low pH only occurred during the first day of treatment. Results since this event have been within the required range.
	Perfluorooctane sulphonate (PFOS)	Additional backwashing of media vessels and monitoring
	Chromium IV compounds	
	Aluminium	Adjusting the coagulant dosing and backwashing
	Manganese	Adjusting the coagulant dosing and backwashing
	Zinc	Additional backwashing of media vessels and monitoring
	Nitrogen total	Adjusting the chlorine dosing
	Phosphorus total	Adjusting the coagulant dosing

The performance of the WTPs is being constantly monitored and different actions are being executed to ensure the discharge concentrations are under the established limits in the EPL Condition L2. As inlet values are over the design limits in some cases, and the obtained results of the monitoring round are over the limits established by the EPL, an updated Water Pollution Impact Assessment (WPIA) based on the performance of the WTP's has been developed and submitted to the EPA as per CoA U1.3. The WPIA refers to the WTP's in order to propose new reasonable and feasible discharge limits that would not result in environmental impacts.

Throughout the reporting period, numerous mitigations measures were implemented in response to various data outliers. Elevated levels of analytes such as TSS, hydrocarbons, nitrate, phosphorus, pH, and various metal compounds were noted throughout the monitoring period. On each occasion, corrective actions were initiated to enhance the effectiveness of the water treatment plants progressively. Measures such as installing additional fish tanks, backwashing media vessels, adjusting coagulant dosing, and modifying chlorine and ammonia dosing were all implemented to reduce key analyte levels and enhance the overall effectiveness of water treatment, ensuring ongoing improvements in water quality standards.

Average daily discharge varies depending on production and groundwater ingress in the station boxes and at the front of the TBM. As an example, the weekly average discharge from the Bays WTP is presented below in Figure 4-A.

Figure 4-A - Average weekly discharge of The Bays WTP



4.6 CONCLUSION

From the six months reporting period, some of the monitoring wells were not accessible due to: sediment deposits inside the bores; located in private property; damaged or removed during construction. For the sampled bores, results showed no exceedances over the determined water quality trigger values.

As noted in EIS Technical Paper 7, background data showed that some heavy metals and ammonia concentration were above the ANZECC (2000) criteria prior to the commencement of works. Thus, it can be concluded that CTP works have not adversely impacted any concentration of heavy metals in the surrounding groundwater table. Given the low fluctuation in the levels of the groundwater, at this stage of the project, the construction works have not caused a drawdown on the surrounding water tables. The groundwater samples generally increased and decreased in line with rainfall changes. Minor exceedances were found in the frequent water treatment plant monitoring, however, they are unlikely to generate an impact in the receiving environment.

APPENDIX A - NOISE MONITORING LOCATIONS AND RESULTS

Sydney Metro West - CTP

The Bays

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

Vibration

WBPS_S1

WBPS_V3

WBPS_V2

WBPS_V1

WBPS_V4

0 50 100 m

This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

afJV

Sydney Metro West - CTP

Five Dock

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

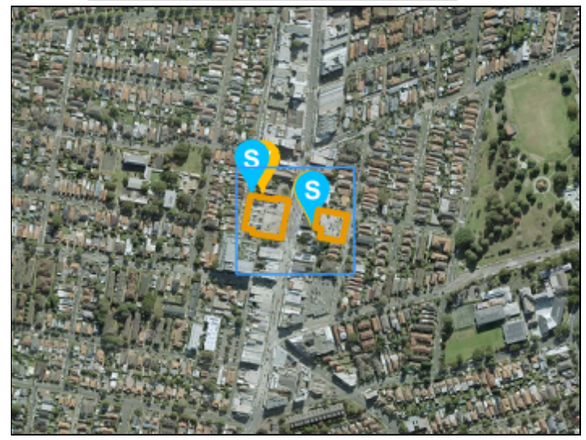
MONITORING

Noise and Vibration

Sound

Vibration

0 20 40 m



afJV

Sydney Metro West - CTP

Burwood North

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

Vibration

BN_N1

BN_V1

BN_V2

0 25 50 m

This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

afJV

Sydney Metro West - CTP

North Strathfield

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

Vibration

0 40 80 m

This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

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Sydney Metro West - CTP

Sydney Olympic Park

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

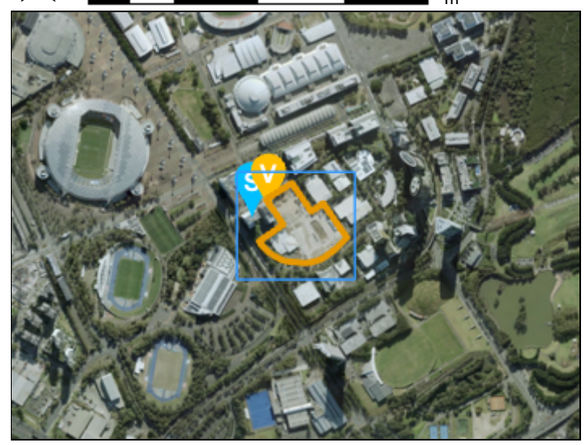
MONITORING

Noise and Vibration

Sound

Vibration

0 30 60 m



afJV

Examples of real-time monitoring setups

[redacted]

Noise Monitoring Results- 21st December-30th June 2023

Date	Time	Site	Source Location	Monitoring Location	Works	NML Level	Model Prediction (LAeq)	LAeq	LA90	LAmax	NMLCompliant	Exceed model prediction?	Exceedance AFJV related?	Notes	Instrumentation Details	Calibration Validity
9/01/23	2300-2315	Burwood	[redacted]	[redacted]	Utilties relocation for driveways	49	70 (stage 2)	53.1		62.5	No	No		Unattened monitor located at [redacted]		
9/01/23	22:00	The Bays	Robert Street, Rozelle	[redacted]	TBM Watermain works	40	77	65	63	79	No	No	N/A	Below prediction	Rion NL-42 (Serial No.: 00145400)	25th May 2023
9/01/23	22:25	The Bays	Robert Street, Rozelle	[redacted]	Utilities	40	58	53	43	72	No	No	N/A	Below prediction	Rion NL-42 (Serial No.: 00145400)	25th May 2023
16/01/23	2215-2230	Burwood	[redacted]	[redacted]	Utilties relocation for driveways	49	70 (stage 2)	62.2		73.3	No	No		Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
16/01/23	2230-2245	FDK	[redacted] Road	[redacted]	HV relocation	43	88 (section 4)	53.8		73.5	No	No			D10 Sigicom unit	30st June 2023
18/01/23	2130-2145	FDK	[redacted] Road	[redacted]	HV relocation	43	88 (section 4)	51.4		61.2	No	No		Unattened monitor located behind [redacted] Rd	D10 Sigicom unit	30th June 2023
23/01/23	2215-2230	Burwood	[redacted]	[redacted]	Utilties relocation for driveways	49	70 (stage 2)	57		73.1	No	No			D10 Sigicom unit	30thJune 2023
29/01/23	2145-2200	FDK	110 Great North Road	[redacted]	HV relocation	43	88 (section 4)	55.6		66.9	No	No		Unattened monitor located next to St Alban Church	D10 Sigicom unit	30th June 2023
31/01/23	2200-2215	Burwood	[redacted]	[redacted]	Utilties relocation for driveways	49	70 (stage 2)	61.1		69.8	No	No		Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
25/01/23	9:35am	North Strathfield	North Strathfield site	North Strathfield train station	Piling and pile breaking	75	80	58.1		73.9	Yes	No	N/A	During the monitoring event construction activities, such as reversing squawkers and pile breakback were audible, but were not noticeably dominant above background noise generated by the train station announcement speaker. During the majority of monitoring when construction noise was audible, contemporaneous notes identified measures levels at ~ 58-79 dB(A). The speaker at the platform for announcements was the largest contributors to background noise (77 – 80dB(A)). A tonal alarm was noted during the monitoring period, which was attributed to a nearby gate opening alarm (not associated with AFJV). No horns or tonal alarms associated with AFJV were observed during the monitoring period. No shouting was observed. Squawker (ie non-tonal) alarms were audible on three occasions. At the monitoring location the noise of spoil being placed in trailer was audible, presumably at the start of filling a new trailer. This noise was noted at 4 occasions during the monitoring period at ~ 60-65dB. The LAmax recorded during the monitoring event was 73.9dB(A), which was attributed to a plane passing by overhead during the monitoring period. Notes undertaken during the monitoring period identified an LAmax of 65dB(A) could be attributed to AFJV works. The attributable LAmax readings during the monitoring period is noted to be above the noise model predictions (LAmax prediction 58 dB(A)) and	1.SVAN 971 (Serial No.: 34933) 2.Pulsar 106 calibrator (Serial No.: 70390)	1. 30 Nov 2023 2. 25 May 2023
30/01/23	9:55am	North Strathfield	North Strathfield site	North Strathfield train station	Piling and pile breaking	75	80	68.1		82.9	Yes	No		A 15-minute sample was undertaken at the monitoring location once construction activities commenced. This measurement was undertaken between 9:35am – 09:50am, and measured an LAeq of 67.1dB, which is 8.4dB below the NML (Approved hours at NCA10). During the monitoring event construction activities, such as reversing squawkers and pile breakback were audible, but were not noticeably dominant above background noise generated by the train station announcement speaker. During the majority of monitoring when construction noise was audible, contemporaneous notes identified measures levels at ~58.3 – 70.1dB(A). The speaker at the platform for announcements was the largest contributors to background noise (77 – 82dB(A)). Considering the noise levels during the majority of the monitoring period, compliance with the NML can be assumed to have been achieved due to noise levels attributable to AFJV activities of ~58.3 – 70.1dB(A). A train movement was noted during the monitoring period, which was attributed to the trains coming in and out of the train station, (not associated with AFJV). No horns or tonal alarms associated with AFJV were observed during the monitoring period. No shouting was observed. Squawker (ie non-tonal) alarms were audible on three occasions. At the monitoring location the noise of pile breakback	1.SVAN 971 (Serial No.: 34933) 2.Pulsar 106 calibrator (Serial No.: 70390)	1. 30 Nov 2023 2. 25 May 2023
1/02/23	2230-2245	FDK	[redacted]	[redacted]	HV relocation	43	88 (section 4)	57.7		63.2	No	No		Unattened monitor located next to St Alban Church	D10 Sigicom unit	30th June 2023
2/02/23	8:00 AM	Burwood	Burwood shaft	Eastern side of northern shaft	Percussion drilling	75	78	60.2	58.4	63.9	Yes	No	N/A	Attended monitoring was undertaken on the 2nd of February 2023 to investigate noise levels from percussion drilling on the eastern face of the northern shaft at Burwood. The attended noise monitoring at the closest receiver situated at [redacted] Concord, demonstrates that percussion drilling did not exceed the daytime INCG NML of 75 dB, with the recorded LAeq of 60.2 dB for this specific period of attended monitoring.	1. Belcur calibrator. 2. Rion NL-52	25th May 2023
6/02/23	2300-2315	Burwood	[redacted]	[redacted]	PEC Testing stage 2	49	58 (stage 2, area 2, night)	56		70.2	No	No		Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
13/02/23	11:27 PM	Five Dock	Great North Road	[redacted]	•Hammering before 22:00pm completed •Vac truck required few times around 22:30pm and 1:30am •Wacker packer required for compaction from 2:50am •Boogie reversion tonal activate	43	87	73	117	88	No	No	N/A	Three monitoring events were undertaken along the Great North Road. At 23:07-Bus passed by ,2x Tipper Truck passed by, 3x Cars passed by. At 23:33-1x Tipper Truck passed by, 2x Cars passed by. At 23:45- 1xtipper truck passed by.	1. Rion NL-42 (S/N 00145400) 2. Calibrator Pulsar 106 (S/N 70390)	Until 25th May 2023
13/02/23	11:33 PM	FIve Dock	Great North Road	[redacted]	•Hammering before 22:00pm completed •Vac truck required few times around 22:30pm and 1:30am •Wacker packer required for compaction from 2:50am •Boogie reversion tonal activate	43	86	69	110	117	No	No	N/A	Three monitoring events were undertaken along the Great North Road. At 23:07-Bus passed by ,2x Tipper Truck passed by, 3x Cars passed by. At 23:33-1x Tipper Truck passed by, 2x Cars passed by. At 23:45- 1xtipper truck passed by.	Rion NL-42	25/05/2023
13/02/23	11:45 PM	FIve Dock	Great North Road	[redacted]	•Hammering before 22:00pm completed •Vac truck required few times around 22:30pm and 1:30am •Wacker packer required for compaction from 2:50am •Boogie reversion tonal activate	43	82	68	117	85	No	No	N/A	Three monitoring events were undertaken along the Great North Road. At 23:07-Bus passed by ,2x Tipper Truck passed by, 3x Cars passed by. At 23:33-1x Tipper Truck passed by, 2x Cars passed by. At 23:45- 1xtipper truck passed by.	Rion NL-42	25/05/2023
13/02/23	8:25am	The Bays	Station box	[redacted]	Hammering in station box, segment shed construction, other works not audible from monitoring location	53	53	59.3	51.2	85.2	No	Yes	No	Dominant noise source was residential (not AFJV) construction noise at nearby residence, ~61-66dB, throughout monitoring with peaks observed at 85dB. Background noise included traffic along Robert Street ~49dB, with vehicles passing directly on Rosser Street and planes flying overhead increasing noise levels ~65dB. AFJV Hammering works were intermittently faintly audible in this location, with levels observed 50-53dB during breaks in other noise sources. Rattle gun works on the segment shed were also faintly audible with levels observed at 51dB in very short bursts during the monitoring period. All other AFJV works were not audible in this location. Exceedance of prediction was caused by non-AFJV works/sources	Rion NL-42 (Serial No.: 00145400)	25/05/2023
14/02/23	10:05 PM	Five Dock	Great North Road	[redacted]	•Digger and vac truck in use •Excavation & trenching	43	87	68	54	101	No	No	N/A	Unaffiliated truck (made loud noise, sat at the traffic light for approximately a minute and passed our site. Took up 3 minutes of loud noise out of 15mins near the end.) Digging was at an on/off pace due to set up of traffic control.	1. Rion NL-42 (S/N 00145400) 2. Calibrator Pulsar 106 (S/N 70390)	Until 25th May 2023
14/02/23	10:21 PM	FIve Dock	Great North Road	[redacted]	•Digger and vac truck in use •Excavation & trenching	43	86	65	61	98	No	No	N/A	No outstanding observations – normal tasks carried out	Rion NL-42	25/05/2023
14/02/23	10:39 PM	FIve Dock	Great North Road	[redacted]	•Digger and vac truck in use •Excavation & trenching	43	82	71	62	102	No	No	N/A	No outstanding observations – normal tasks carried out	Rion NL-42	25/05/2023
20/02/23	4:00 PM	Burwood	Cavern	Burwood North Station cavern	Scrubber			68.1	63.6	82.9				During the monitoring event construction activities, such as Vac trucks, reversing squawkers and pile breakback were audible, but were not noticeably dominant above background noise generated by the train station announcement speaker. During the majority of monitoring when construction noise was audible, contemporaneous notes identified measures levels at ~63.4 – 69.4dB(A). Vac truck operation on site was the largest contributors to background noise (63.4 – 63.8dB(A)). Considering the noise levels during the majority of the monitoring period, compliance with the NML can be	SVAN 971 (Serial No.: 34933)	25/05/2023
21/02/23	2230-2245	Burwood	[redacted]	[redacted]	PEC Testing stage 2	49	58 (stage 2, area 2, night)	60.9		67.1	No	Yes		Unattened monitor located at [redacted] Further monitoring would be undertaken.	D10 Sigicom unit	30th June 2023
28/02/23	2330-2345	Burwood	[redacted]	[redacted]	Bulldozer delivery	49	59	59.1		69.6	No	Equal		Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
9/03/23	2215-2230	Burwood	[redacted]	[redacted]	Pilling Rig Delivery	49	44	59.3		65.7	No	Yes		Unattened monitor located at [redacted] Noise source unable to be verified.	D10 Sigicom unit	30th June 2023
16/03/23	2330-2345	Burwood	Corner of Parra & Burwood Rd	[redacted]	Removal of B class hoarding	49	47	58.3		64.1	No	Yes		Unattened monitor located at [redacted] Attended noise monitoring was scheduled to verify noise levels of the same work activity at Burwood North during August 2023 (outside the current reporting period). However when attended monitoring commenced it began raining and therefore, attended data wasn't captured. Unattended monitoring from that night showed noise levels were below predicted levels throughout the night (note it was a cumulaitve prediction because utilities work was also occurring).	D10 Sigicom unit	30th June 2023
17/03/23	11:33 AM	Five Dock	Five Dock West	Adjacent to St Albans Church	Work in western shaft	65	73	61	60	66	Yes	No	N/A	Below high noise impact and prediction.	Rion NL-42	25/05/2023
17/03/23	12:29 PM	Five Dock	Five Dock West	[redacted]	Work in western shaft	52	85	54	48	75	No	No	N/A	Below high noise impact and prediction	Rion NL-42	25/05/2023
19/03/23	8:00 - 8:15AM	North Strathfield	North -West and South East corner of the North Strathfield Station Box	[redacted]	Drilling of boreholes for Row 1 active ground anchor	56	70	65	58	85	No	No	N/A	Dominant noise source was the Drill rig - soil nailing works while operating on site~ 64-70dB. Background noise included traffic along Queen Street ~55-57dB. Vehicles taking off from a stationary position at high speed/fast pace along Queen Street increasing noise levels ~80 - 84dB. Work occurred during Sydney Trains isolations.	Rion NL-42	25/05/2023

19/03/23	8:20 - 8:35AM	North Strathfield	North -West and South East corner of the North Strathfield Station Box	[redacted]	Drilling of boreholes for Row 1 active ground anchor	56	70	67	68	87	No	No	N/A	Dominant noise source was the Drill rig - soil nailing works while operating on site~ 66-70dB. Background noise included traffic along Queen Street ~55-57dB. Vehicles taking off from a stationary position at high speed/fast pace along Queen Street increasing noise levels ~84 - 87dB. Work occurred during Sydney Trains isolations.	Rion NL-42	25/05/2023
19/03/23	8:40 - 8:55AM	North Strathfield	North -West and South East corner of the North Strathfield Station Box		Drilling of boreholes for Row 1 active ground anchor	56	70	64	56	85	No	No	N/A	Dominant noise source was the Drill rig - soil nailing works while operating on site~ 64-70dB. Background noise included traffic along Queen Street ~55-57dB. Vehicles taking off from a stationary position at high speed/fast pace along Queen Street increasing noise levels ~80 - 84dB. Work occurred during Sydney Trains isolations.	Rion NL-42	25/05/2023
23/03/23	11:45 AM	The Bays	Station box		Excavation within station box including hammering, segment shed cladding, TBM assembly, spoil load out and spoil shed structure construction.	53	53	56.3	42.5	79.3	No	Yes	No	Works observed to be occurring just prior to the noise monitoring event included excavation within station box including hammering, segment shed cladding, TBM assembly, spoil load out and spoil shed structure construction. The monitoring event was undertaken at 2[redacted] selected due to modelling indicating that this receiver had the highest prediction in relation to the NCA NML. During the monitoring event, the dominant noise source was nearby residential noise, with minor construction noise (residential sawing) and traffic passing along Rosser St directly adjacent to the noise monitoring location shown to be at elevated levels observed to likely be the source of LAMax readings. Background noise included traffic along Robert Street, birds and planes flying overhead as well as residential noise such as talking and pets. Other construction noise was also observed (hammering steel) and was later attributed to restoration works at White Bay Power Station. While LAeq was observed to be slightly over standard daytime NML, observations during monitoring event indicate that this is likely attributed to residential and traffic noise not associated with AFJV construction works, with breaks in those noise sources showing observations of targeted monitoring in line with NML.	Rion NL-42 (Serial No.: 00145400)	25/05/2023
20/03/23	2245-2300	Burwood	[redacted]		PEC Testing stage 2	49	62 (stage 3, area 2)	57		67.1	No	No		Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
20/03/23	2200-2215	FDK	[redacted]		Cable pulling	43	93	48.3		65.1	No	No		Unattened monitor located next to St Alban Church	D10 Sigicom unit	30th June 2023
24/03/23	8:02-8:17 am	Burwood	Cavern		Mucking out with 24t excavator, rock breaking at eastern end of shaft and short haul of spoil with dump truck.	53	N/A	82	81	89	No	N/A	N/A	30m from cavern works at floor of shaft. Not representative of noise at receiver	Rion NL-42	25/05/2023
24/03/23	8:32-8:47 am	Burwood	Cavern		Mucking out with 24t excavator, rock breaking at eastern end of shaft and short haul of spoil with dump truck.	53	N/A	75	71	87	No	N/A	N/A	88m from cavern works. Below high noise impact level Cavern works and shaft excavation works audible	Rion NL-42	25/05/2023
27/03/23	2245-2300	Burwood	[redacted]		Utilties relocation for driveways	49	70 (stage 2)	53.2		73.5	No	No		Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
27/03/23	1:45-2pm	FDK	FDK Western shaft		Shaft excavation: excavator with hammer attachment, bulldozer, excavator managing stockpile	52	95	65.8		80.3	No	No		If 10dB reduction is assumed for HV shed then the noise level is below prediction for both non-rippable and rippable excavations.	Sigicom S50	
28/03/23	10:45-11:00 am	Burwood	Nozzle trial		Nozzle excavation(14t excavator with breaker), shotcrete pumping and spraying and spoil load out along Parra road.	53	39	62	56	77	No	Yes	No	13 dB below high noise impact level of 75dB. External noise sources included: Traffic Along Loftus Street and Parra Rd, HV & LV's, Birds chirping (5 – 20m away), drone, aeroplane, bus on Loftus St. Exceedance of prediction was not caused by AFJV works.	Rion NL-42	25/05/2023
29/03/23	2245-2300	FDK	[redacted]		Cable pulling	43	93	63.9		56	No	No		Unattened monitor located next to St Alban Church	Sigicom S50	
30/03/23	10:10-10:25 pm	Burwood	Generator under Burwood office		Generator running	47	47	55	53.3	70.8	No	Yes	No	Observations: HV & LV's passing along Burwood Rd and burton St, Crickets chirping (1 – 20m), emergency vehicle sirens, bus accelerating around roundabout (Lmax 64.5). The attended noise monitoring data is within 5.5dB of the NML due to the application of a façade correction factor of minus 2.5dB, as per the table 7, assessment location for existing land uses under section 2.5.4 locations where noise assessment criteria apply in the NSW Road Noise Policy (EPA). Additionally, the use of LA90 in this instance is consistent with section 7.1.1 of the Noise Policy for Industry (EPA), in filtering extraneous noise events other than the constant noise source. With consideration to these factors, the LA90 is 50.8 4dB which brings the dB level to within 4dB of the NML compliance level of 47dB. The team also adopted several reasonable and feasible noise mitigation measures including the application of noise blankets, extending the exhaust to the top of the 3 stack offices and the construction of class A hoarding to mitigate noise.	Rion NL-42	25/05/2023
3/04/23	22:40	Five Dock	Great North Road		Jointing works (use of hand machine and hand tools)	38	82	52.7	50.7	71.2	No	No		Noise made primarily by passing cars and trucks as barely any noise was produced from AFJV work area	Rion NL-42	26/05/2023
3/04/23	22:58	Five Dock	Great North Road		Jointing works (use of hand machine and hand tools)	43	75	54.5	52.4	68.5	No	No		Noise made primarily by passing cars and trucks as barely any noise was produced from AFJV work area	Rion NL-42	27/05/2023
3/04/23	23:25	Five Dock	Great North Road		Jointing works (use of hand machine and hand tools)	43	72	58.8	51.3	92.8	No	No		Noise made primarily by passing cars and trucks as barely any noise was produced from AFJV work area	Rion NL-42	28/05/2023
3/04/23	12:15AM	Burwood	Burwood North		Crane in use to move concrete barriers, Light Vac truck	47	76	61.1	50.6	89.8	N	No		Below prediction		
3/04/23	12:32AM	Burwood	Burwood North		Crane in use to move concrete barriers, Light Vac truck	47	78	64.7	60.6	97.7	N	No		Below prediction		
3/04/23	12:50AM	Burwood	Burwood North		Crane in use to move concrete barriers, Light Vac truck	47	78	60.2	51	88.3	N	No		Below prediction		
3/04/23	2300-2315	Burwood	[redacted]		Utilties relocation for driveways	49	70 (stage 2)	53.5		74.4	No	No		Unattened monitor located at 16 Burton Street	Sigicom S50	
3/04/23	2300-2315	Burwood	[redacted]		Utilties relocation for driveways	49	70 (stage 2)	53.5		74.4	No	No		Unattened monitor located at 16 Burton Street	Sigicom S50	
14/04/23	9:30am	Five Dock	Street sweeper along Great North Road		Street sweeper along Great North Rd & Second Ave	75	N/A	83	71	87	No	N/A	N/A	Spot check only not Laeq15min. Noise from pedestrians and local traffic also audible	Rion NL-42	25/05/2023
14/04/23	9:30am	Five Dock	Street sweeper along Great North Road and second avenue		Street sweeper along Great North Rd & Second Ave	75	N/A	76	71	81	No	N/A	N/A	Spot check only not Laeq15min. Noise from pedestrians and local traffic also audible	Rion NL-42	25/05/2023
14/04/23	10:45am-11am	FDK	FDK Western shaft		Shaft excavation: excavator with hammer attachment, bulldozer, drill rig, excavator managing stockpile	52	95	70.7		79.2	No	No		If 10dB reduction is assumed for HV shed then the noise level is below prediction for non-rippable and within 2.7 dB of rippable model.	Sigicom S50	
14/04/23	1:30-1:45pm	FDK	FDK Western shaft		Shaft excavation: excavator with hammer attachment, bulldozer, drill rig, excavator managing stockpile	52	95	67.3		76.9	No	No		If 10dB reduction is assumed for HV shed then the noise level is still below prediction for both scenarios.	Sigicom S50	
17/04/23	3:30-345pm	SOP	SOP Station box		Shaft excavation: 4 excavators in station box, bulldozer, 2 excavators on surface managing stockpile and loading trucks, truck and dogs for spoil haulage	58	75	61.4		73.5	No	No		Below prediction. Time chosen was the highest LAeq15min of the day. Difference between predicted LAeq15min for rippable and actual is 13.6 dBA.	Sigicom S50 #14624	26/06/2023
17/04/23	8:31-8:46pm	Five Dock	Five Dock East		Lowering of cherry Picker and installation of brackets on shaft wall inside acoustic shed	48	48	51	49	62	No	Yes	No	Dominant noise sources were not construction related. Noise sources included: LV's passing along Second Ave (35m) , LV's passing along Great North Road(30m), Airplane passing overhead, crickets in background (5-20m) , buses on GNR (30m), intermittent noise in shed.	Rion NL-42	25/05/2023
17/04/23	8:59pm - 9:14pm	Five Dock	No construction activities being carried out on the west shaft. Installation of brackets was being undertaken on the east shaft.		No construction activities being carried out on the west shaft. Installation of brackets was being undertaken on the east shaft, 127m away in an acoustic shed.	46	46	53	50	67	No	Yes	No	Dominant noise sources were not construction related. Noise sources included: People walking though Fred Kelly Place (5-20m), Vehicles passing along GNR (55m), Vehicles passing along Garfeild St (66m), shopping trolleys, buses, people talking, noise from restaurant	Rion NL-42	25/05/2023
17/04/23	11:08-11:23 pm	Burwood	Burwood North Shaft		•Generator running (31m) •Gantry crane being used (90m) •RH benching in cavern and excavator stockpiling behind RH (85m)	47	47	54	53	57	No	Yes	No	Other observations: LV's passing on Burton Street (11m), LV's passing on Burwood Rd (40m), bus going around roundabout (40m) The attended noise monitoring data is within 5dB of the NML due to the application of a façade correction factor of minus 2.5dB, as per the table 7, assessment location for existing land uses under section 2.5.4 locations where noise assessment criteria apply in the NSW Road Noise Policy (EPA). Additionally, the use of LA90 in this instance is consistent with section 7.1.1 of the Noise Policy for Industry (EPA), in filtering extraneous noise events other than the constant noise source. With consideration to these factors, the LA90 is 51.4dB which brings the dB level to within 5dB of the NML compliance level of 47dB. The team also adopted several reasonable and feasible noise mitigation measures including the application of noise blankets, extending the exhaust to the top of the 3 stack offices and the construction of class A hoarding to mitigate noise.	Rion NL-42	25/05/2023
18/04/23	12:43-12:58 am	Burwood	Burwood North Shaft		•Excavator scraping back hardstand in front of adit (90m) •RH benching in cavern (130m) and excavator stockpiling in cavern	47	47	59	55	74	No	Yes	No	Work associated with tunnelling. General observations: HV's and LV's passing on Parra Rd (65m) , birds, tunnelling activities including excavator, bobcat, gantry crane. All Reasonabile and feasible mitigation measures were implemented as part of these works.	Rion NL-42	25/05/2023
18/04/23	1:11-1:26 am	Burwood	Inside shaft		•RH benching in cavern (180m) & excavator stockpiling in cavern •Bobocat with broom attachment cleaning bridge (160m)	47	47	57	48	73	No	Yes	No	Work associated with tunnelling. Oservations: LV's passing on Parra Rd (90m) and on Loftus (5-10m), bus, gantry crane, compressor at petrol station, squawker on reversing plant. All Reasonabile and feasible mitigation measures were implemented as part of these works.	Rion NL-42	25/05/2023
18/05/23	8-8:15am	Five Dock	FDK Western shaft		Shaft excavation: excavator with hammer attachment, bulldozer, drill rig, excavator managing stockpile	52	95	67		76.9	No	No		If 10dB reduction is assumed for HV shed then the noise level is still below prediction for both scenarios.	Sigicom S50	
18/05/23	4:15-4:30pm	Five Dock	FDK Western shaft		Shaft excavation: excavator with hammer attachment, bulldozer, drill rig, excavator managing stockpile	52	95	68.4		76.9	No	No		Difference between predicted and actual is 26.6 dB. If 10dB reduction is assumed for HV shed then the noise level is still below prediction	Sigicom S50	

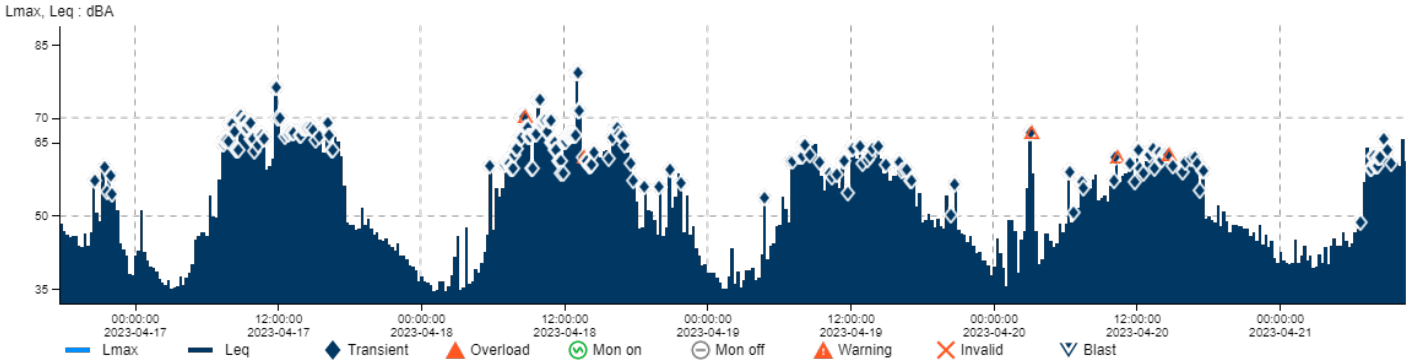
29/05/23	11:15-11:30 am	SOP	SOP Station box	[redacted]		Shaft excavation: 4 excavators in station box, bulldozer, 2 excavators on surface managing stockpile and loading trucks, truck and dogs for spoil haulage. Nozzle work has commenced: excavator, scrubber, dump truck	58	75	60.9		79.6	No	No		Below prediction. Time chosen was the highest LAeq15min of the day. Difference between predicted LAeq15min for rippable and actual is 14.1 dBA. The noise level on 29 May 2023 is less than what was measured on 17 April 2023 prior to nozzle work commencing which indicates that the nozzle work doesn't increase noise levels at the monitoring point.	Sigicom S50 #14624	26/06/2023
6/06/23	10:44pm-10:59 PM	Burwood	Burwood Cavern			Cutting in cavern, loading with ribble in spoil shed.	47	47	54		74	No	Yes	No	Noise from LVs on Parramatta Rd, AC unit, tonal reversing not from site, residents talking, plane. Graph on the same night (6 June) from the unattended logger at 16 Burton St shows the minimum LAeq15min was 51.7 dBA at 3am. Two examples of noise levels from the unattended logger on Sunday nights, 11 June and 7 August 2023, when no construction work was occurring which shows the minimum LAeq15min for the period 6pm-7am was 48.3 dBA and 50.2 dBA respectively. Both minimum values are above the NCA12 NMLs. It's assumed the lowest LAeq15min of the night occurs at the time with the lowest influence from passing traffic. Based on these results, it can be inferred that the noise recorded when cavern excavations are occurring is similar to the Sunday baseline of 48.3-50.2 dBA. Therefore the cavern excavation was compliant.	Svantek 971	13/04/2024
6/06/23	11:05 - 11:20 pm	Burwood	Burwood Cavern			Cutting in cavern, loading with kibble in spoil shed.	47	47	60		73	No	Yes	No	Noise from air compressor at service station, LV and HVs on Loftus St, humming from site (source unknown). Graph on the same night (6 June) from the unattended logger at [redacted] shows the minimum LAeq15min was 51.7 dBA at 3am. Two examples of noise levels from the unattended logger on Sunday nights, 11 June and 7 August 2023, when no construction work was occurring which shows the minimum LAeq15min for the period 6pm-7am was 48.3 dBA and 50.2 dBA respectively. Both minimum values are above the NCA12 NMLs. It's assumed the lowest LAeq15min of the night occurs at the time with the lowest influence from passing traffic. Based on these results, it can be inferred that the noise recorded when cavern excavations are occurring is similar to the Sunday baseline of 48.3-50.2 dBA. Therefore the cavern excavation was compliant.	Svantek 971	14/04/2024
6/06/23	11:40 - 11:55PM	Five Dock	Five Dock East			Drilling, scrubber fans, bobcat, gantry crane within acoustic shed	43	43	67		70	No	Yes	No	A trial of the ventilation fans placed at the bottom of the shaft excavation was conducted to determine the noise levels. The fans have a silencer attached as mitigation to minimise impact on the local community. Noise monitoring was conducted to determine the noise levels of the fans. It was found that despite the silencers, the noise caused by the fans was above NML and being operated at night for the trial. The trail was conducted to obtain noise monitoring at a time when background levels were representative of nighttime impacts. NCR20 issued for this event.	Svantek 971	13/04/2024
6/06/23	12:00 - 12:12AM	Five Dock	Five Dock East			Drilling, scrubber fans, bobcat, gantry crane within acoustic shed	43	43	53		68	No	Yes	No	A trial of the ventilation fans placed at the bottom of the shaft excavation was conducted to determine the noise levels. The fans have a silencer attached as mitigation to minimise impact on the local community. Noise monitoring was conducted to determine the noise levels of the fans. It was found that despite the silencers, the noise caused by the fans was above NML and being operated at night for the trial. The trail was conducted to obtain noise monitoring at a time when background levels were representative of nighttime impacts. NCR20 issued for this event.	Svantek 971	13/04/2024
6/06/23	12:43 AM	The Bays	The Bays			General activities at The Bays	40	40	42		58	No	Yes	No	Observations: LV and HVs in distance. Crickets and birds chirping	Svantek 971	13/04/2024
7/06/23	22:10	Five Dock	Ventilation			Ventilation	38	38	61		70	No	Yes	No	Planned vent trial during night period when background noise is less. Fans did not continue throughout night	Svantek 971	13/04/2024
14/06/23	19:37	Five Dock	Background			Background noise	48	48	49		62	No	N/A	N/A	Planned vent trial during evening/night. Spot check only not Laeq15min. Fans did not continue throughout night	Svantek 971	13/04/2024
14/06/23	19:44	Five Dock	Ventilation			Central cavern fan stage 2	48	N/A	63		65	No	N/A	N/A	Planned vent trial during evening/night. Spot check only not Laeq15min. Fans did not continue throughout night	Svantek 971	13/04/2024
14/06/23	19:49	Five Dock	Ventilation			Central cavern fan stage 1	48	N/A	62		66	No	N/A	N/A	Planned vent trial during evening/night. Spot check only not Laeq15min. Fans did not continue throughout night	Svantek 971	13/04/2024
14/06/23	19:54	Five Dock	Ventilation			Eastern cavern fan stage 2	48	N/A	61		62	No	N/A	N/A	Planned vent trial during evening/night. Spot check only not Laeq15min. Fans did not continue throughout night	Svantek 971	13/04/2024
14/06/23	20:02	Five Dock	Ventilation			Eastern cavern fan stage 1	48	N/A	56		58	No	N/A	N/A	Planned vent trial during evening/night. Spot check only not Laeq15min. Fans did not continue throughout night	Svantek 971	13/04/2024
14/06/23	20:08	Five Dock	Ventilation			Eastern & central cavern fans	48	N/A	65		67	No	N/A	N/A	Planned vent trial during evening/night. Spot check only not Laeq15min. Fans did not continue throughout night	Svantek 971	13/04/2024
14/06/23	20:30	Five Dock	Ventilation			Compressor	46	46	46		55	No	No	No	On level with model prediction	Svantek 971	13/04/2024

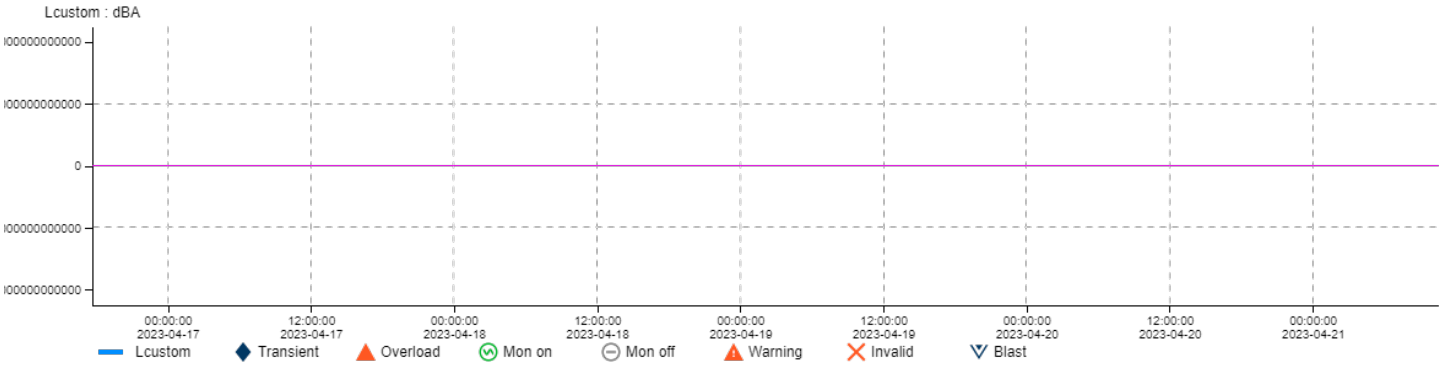
Examples of unattended monitoring records

Date	Time	Report No.	Conducted by	Site	Purpose	OOHW Permit No.	Source Location	Monitoring Location	Works	NML Level	Model Prediction (LAeq)	LAeq	LA90	LAmax	NML Compliant	Exceed model prediction?	Notes	Instrumentation Details	Calibration Validity
9/01/23	2300-2315		Unattended	BWD	OOHW	20	[redacted]	[redacted]	Utilities relocation for driveways	49	70 (stage 2)	53.1		62.5	No	No	Unattened monitor located at [redacted]		
16/01/23	2215-2230		Unattended	BWD	OOHW	20			Utilities relocation for driveways	49	70 (stage 2)	62.2		73.3	No	No	Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
16/01/23	2230-2245		Unattended	FDK	OOHW	25			HV relocation	43	88 (section 4)	53.8		73.5	No	No		D10 Sigicom unit	30st June 2023
18/01/23	2130-2145		Unattended	FDK	OOHW	25			HV relocation	43	88 (section 4)	51.4		61.2	No	No	Unattened monitor located behind [redacted]	D10 Sigicom unit	30th June 2023
23/01/23	2215-2230		Unattended	BWD	OOHW	20			Utilities relocation for driveways	49	70 (stage 2)	57		73.1	No	No		D10 Sigicom unit	30thJune 2023
29/01/23	2145-2200		Unattended	FDK	OOHW	25			HV relocation	43	88 (section 4)	55.6		66.9	No	No	Unattened monitor located next to St Alban Church	D10 Sigicom unit	30th June 2023
31/01/23	2200-2215		Unattended	BWD	OOHW	20			Utilities relocation for driveways	49	70 (stage 2)	61.1		69.8	No	No	Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
1/02/23	2230-2245		Unattended	FDK	OOHW	25			HV relocation	43	88 (section 4)	57.7		63.2	No	No	Unattened monitor located next to St Alban Church	D10 Sigicom unit	30th June 2023
6/02/23	2300-2315		Unattended	BWD	OOHW	154			PEC Testing stage 2	49	58 (stage 2, area 2, night)	56		70.2	No	No	Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
21/02/23	2230-2245		Unattended	BWD	OOHW	154			PEC Testing stage 2	49	58 (stage 2, area 2, night)	60.9		67.1	No	Yes	Unattened monitor located at [redacted] Further monitoring would be undertaken	D10 Sigicom unit	30th June 2023
28/02/23	2330-2345		Unattended	BWD	OOHW	164			Bulldozer delivery	49	59	59.1		69.6	No	Equal	Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
9/03/23	2215-2230		Unattended	BWD	OOHW	254			Pilling Rig Delivery	49	44	59.3		65.7	No	Yes	Unattened monitor located at [redacted] Noise source unable to be verified	D10 Sigicom unit	30th June 2023
16/03/23	2330-2345		Unattended	BWD	OOHW	6			Removal of B class hoarding	49	47	58.3		64.1	No	Yes	Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
20/03/23	2245-2300		Unattended	BWD	OOHW	154			PEC Testing stage 2	49	62 (stage 3, area 2)	57		67.1	No	No	Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
20/03/23	2200-2215		Unattended	FDK	OOHW	183			Cable pulling	43	93	48.3		65.1	No	No	Unattened monitor located next to St Alban Church	D10 Sigicom unit	30th June 2023
27/03/23	2245-2300		Unattended	BWD	OOHW	20			Utilities relocation for driveways	49	70 (stage 2)	53.2		73.5	No	No	Unattened monitor located at [redacted]	D10 Sigicom unit	30th June 2023
27/03/23	1:45-2pm		Unattended	FDK	Verification	N/A			Shaft excavation: excavator with hammer attachment, bulldozer, excavator managing stockpile	52	95	65.8		80.3	No	No	If 10dB reduction is assumed for HV shed then the noise level is below prediction for both non-rippable and rippable excavations.	Sigicom S50	
29/03/23	2245-2300		Unattended	FDK	OOHW	183			Cable pulling	43	93	63.9		56	No	No	Unattened monitor located next to St Alban Church	Sigicom S50	
3/04/23	2300-2315		Unattended	BWD	OOHW	20			Utilities relocation for driveways	49	70 (stage 2)	53.5		74.4	No	No	Unattened monitor located at [redacted]	Sigicom S50	
3/04/23	2300-2315		Unattended	BWD	OOHW	20			Utilities relocation for driveways	49	70 (stage 2)	53.5		74.4	No	No	Unattened monitor located at [redacted]	Sigicom S50	
14/04/23	10:45am-11am		Unattended	FDK	Verification	N/A			Shaft excavation: excavator with hammer attachment, bulldozer, drill rig, excavator managing stockpile	52	95	70.7		79.2	No	No	If 10dB reduction is assumed for HV shed then the noise level is below prediction for non-rippable and within 2.7 dB of rippable model.	Sigicom S50	
14/04/23	1:30-1:45pm		Unattended	FDK	Verification	N/A			Shaft excavation: excavator with hammer attachment, bulldozer, drill rig, excavator managing stockpile	52	95	67.3		76.9	No	No	If 10dB reduction is assumed for HV shed then the noise level is still below prediction for both scenarios.	Sigicom S50	
17/04/23	3:30-345pm	SOP_20230417	Unattended	SOP	Verification	N/A			Shaft excavation: 4 excavators in station box, bulldozer, 2 excavators on surface managing stockpile and loading trucks, truck and dogs for spoil haulage	58	75	61.4		73.5	No	No	Below prediction. Time chosen was the highest LAeq15min of the day. Difference between predicted LAeq15min for rippable and actual is 13.6 dBA.	Sigicom S50 #14624	26/06/2023
18/05/23	8-8:15am		Unattended	Five Dock	Verification	N/A			Shaft excavation: excavator with hammer attachment, bulldozer, drill rig, excavator managing stockpile	52	95	67		76.9	No	No	If 10dB reduction is assumed for HV shed then the noise level is still below prediction for both scenarios.	Sigicom S50	
18/05/23	4:15-4:30pm		Unattended	Five Dock	Verification	N/A			Shaft excavation: excavator with hammer attachment, bulldozer, drill rig, excavator managing stockpile	52	95	68.4		76.9	No	No	Difference between predicted and actual is 26.6 dB. If 10dB reduction is assumed for HV shed then the noise level is still below prediction	Sigicom S50	
29/05/23	11:15-11:30 am	SOP_20230529	Unattended	SOP	Verification	N/A			Shaft excavation: 4 excavators in station box, bulldozer, 2 excavators on surface managing stockpile and loading trucks, truck and dogs for spoil haulage. Nozzle work has commenced: excavator, scrubber, dump truck	58	75	60.9		79.6	No	No	Below prediction. Time chosen was the highest LAeq15min of the day. Difference between predicted LAeq15min for rippable and actual is 14.1 dBA. The noise level on 29 May 2023 is less than what was measured on 17 April 2023 prior to nozzle work commencing which indicates that the nozzle work doesn't increase noise levels at the monitoring point.	Sigicom S50 #14624	26/06/2023

Interval report

Project	FDK
Project maintainer	-
Time frame	2023-04-16 17:40 - 2023-04-21 10:34 (Australia/Sydney)
Measuring point	FDK_4
Description	St Albans Church noise
Sensor type	S50
Sensor S/N	14157
Master(s) serial no.	107963
Latest calibration	2022-01-19
Standard	(02) Lmax + Leq 30-105 dBA Fast
Unit	dBA
Quantity	Sound Pres.Level, Eqv.Sound Pres.L, Leq accumulation
Interval time	15 minutes
Table threshold	High
Max	Lmax: 103 dBA, Leq: 79.5 dBA, Lcustom: null



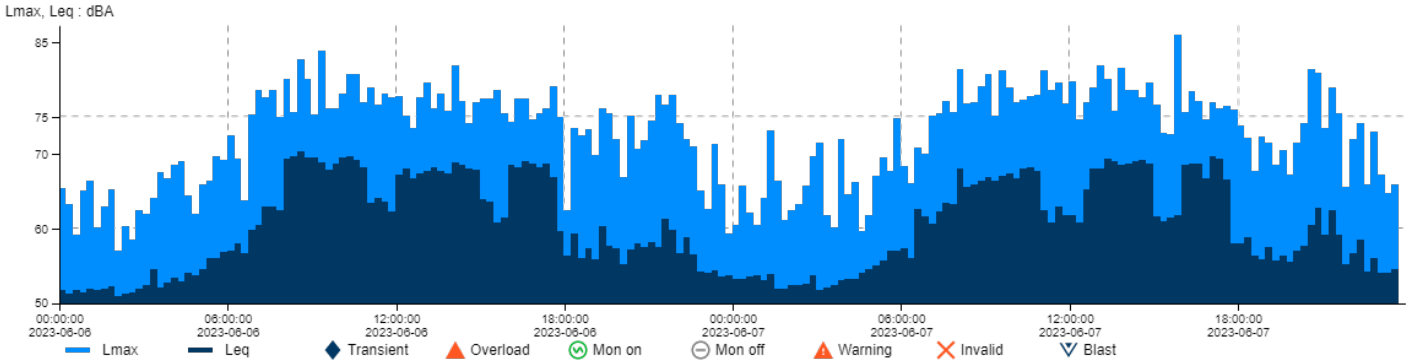


X-span	2023-04-16 17:40 - 2023-04-21 10:34
Y-span	Lmax, Leq : dBA: 32.04 - 89, Lcustom : dBA: 9007199254740991 - -9007199254740991

	Lmax	Leq	Lcustom
Max	98.7 dBA	79.5 dBA	
Date	2023-04-18	2023-04-18	-
Time	08:45:00	13:15:00	-

Interval report

Project	BWD
Project maintainer	-
Time frame	2023-06-06 00:00 - 2023-06-07 23:59 (Australia/Sydney)
Measuring point	BWD_1
Description	[redacted]
Sensor type	S50
Sensor serial no.	14085
Master(s) serial no.	108062
Latest calibration	2021-11-01
Standard	(02) Lmax + Leq 30-105 dBA Fast
Unit	dBA
Quantity	Sound Pres.Level, Eqv.Sound Pres.L, Leq accumulation
Interval time	15 minutes
Table threshold	High
Max	Lmax: 85.9 dBA, Leq: 70.3 dBA, Lcustom: null

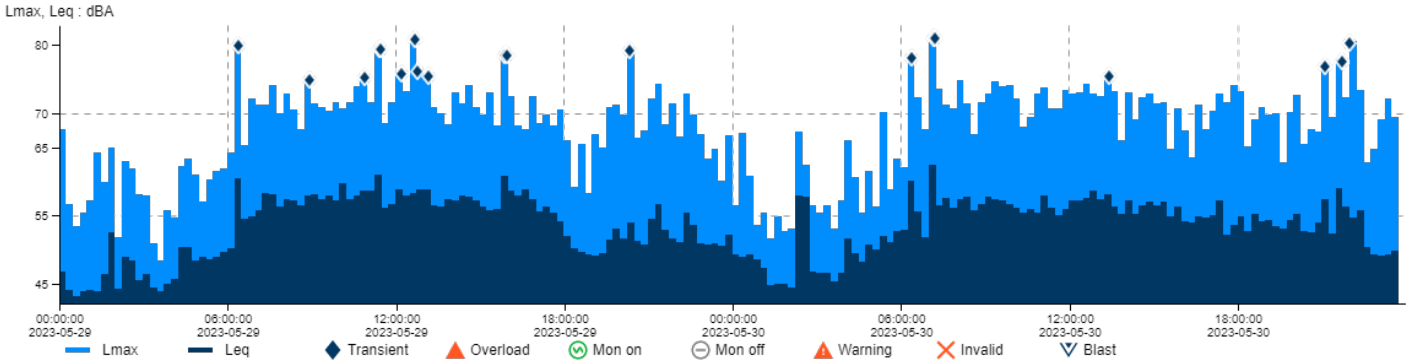


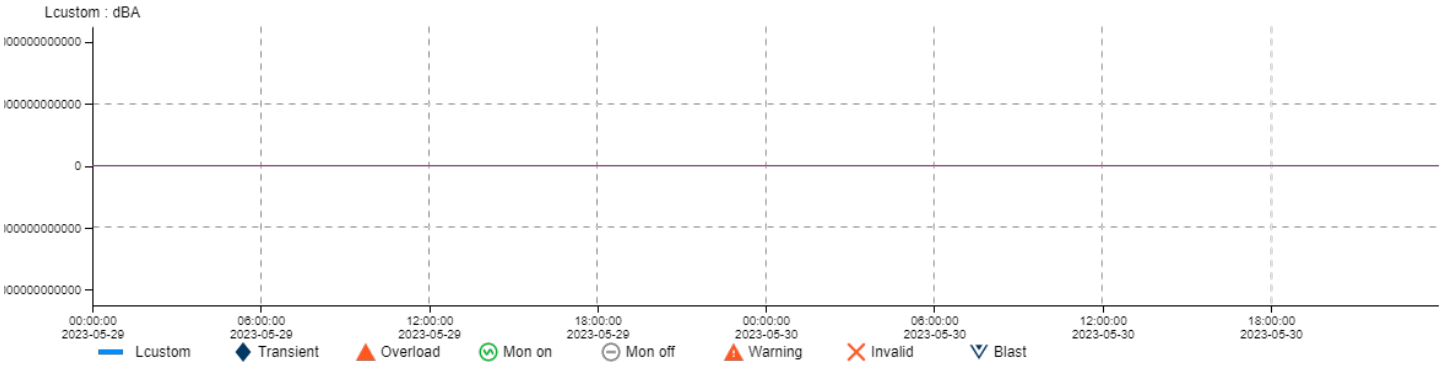
X-span	2023-06-06 00:00 - 2023-06-07 23:59
Y-span	Lmax, Leq : dBA: 49.93 - 87.35, Lcustom : dBA: 9007199254740991 - -9007199254740991

	Lmax	Leq	Lcustom
Max	85.9 dBA	70.3 dBA	
Date	2023-06-07	2023-06-06	-
Time	16:00:00	08:45:00	-

Interval report

Project	SOP
Project maintainer	-
Time frame	2023-05-29 00:00 - 2023-05-30 23:59 (Australia/Sydney)
Measuring point	N1 #14624
Description	Second floor balcony Pullman Hotel
Sensor type	S50
Sensor serial no.	14624
Master(s) serial no.	108060
Latest calibration	2022-06-26
Standard	(03) Lmax + Leq 40-115 dBA Fast
Unit	dBA
Quantity	Sound Pres.Level, Eqv.Sound Pres.L, Leq accumulation
Interval time	15 minutes
Table threshold	High
Max	Lmax: 81.3 dBA, Leq: 62.3 dBA, Lcustom: null





X-span	2023-05-29 00:00 - 2023-05-30 23:59
Y-span	Lmax, Leq : dBA: 42.14 - 82.95, Lcustom : dBA: 9007199254740991 - -9007199254740991

	Lmax	Leq	Lcustom
Max	81.3 dBA	62.3 dBA	
Date	2023-05-30	2023-05-30	-
Time	07:15:00	07:15:00	-

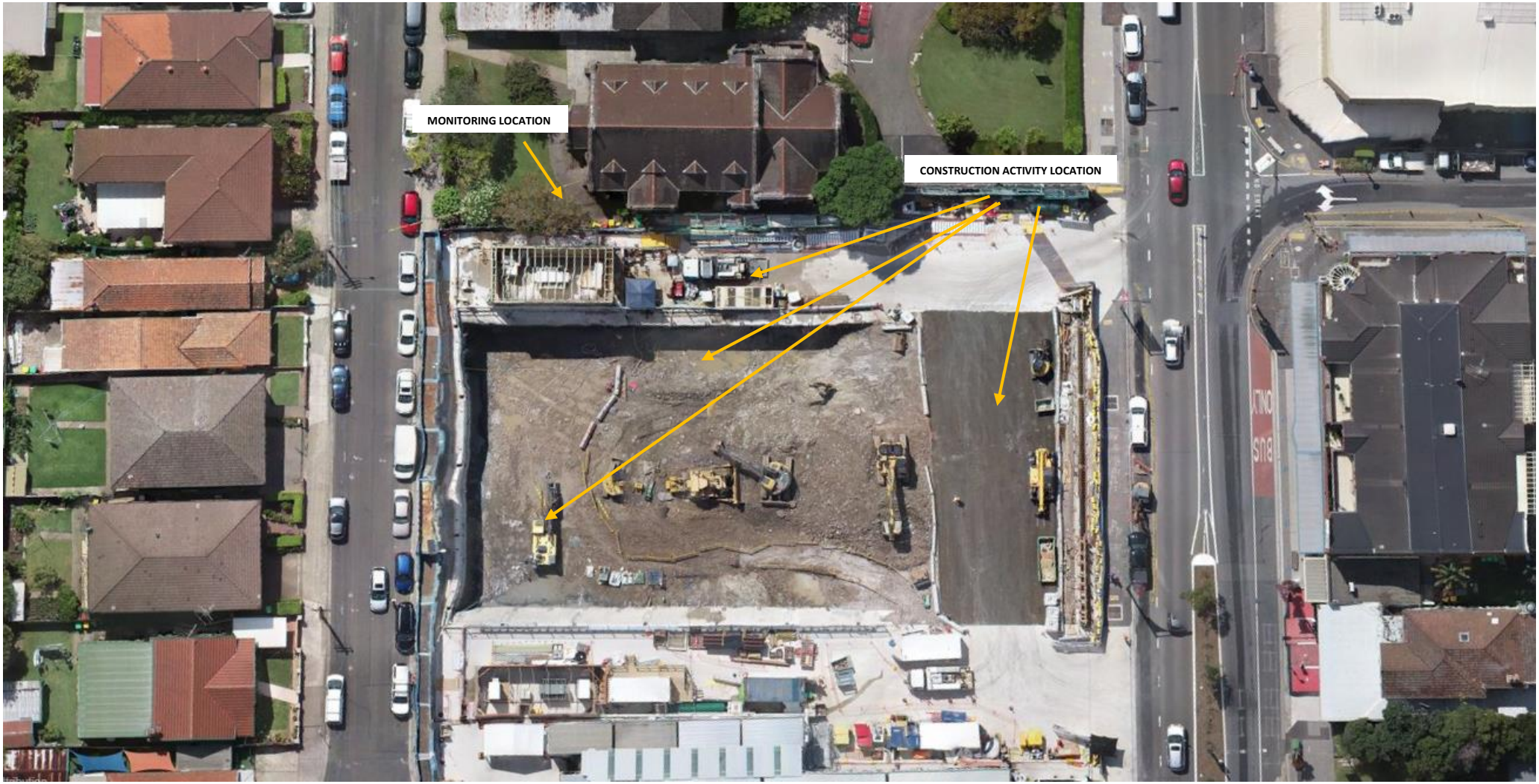
Noise monitoring report

Project: Sydney Metro West – Central Tunnelling Package		**Report No. n/a**	
Data collected by: [redacted]		**Date**: 17/03/23	
Time: 11:33am & 12:29pm			
Was this monitoring event conducted in response to a complaint? YES ☐ **NO** ☒			
Location of construction activity (see Attachment A)		**Monitoring locations** Listed in map below	
Observed construction activity • Agi pumping • Shotcreting north wall of western shaft • Air compressor running • Small 6Kva generator running			
Meteorological conditions			
Wind	Light wind		
Temperature (°C):	33	**Cloud cover**: Clear	
Instrumentation details:	Rion NL-42	**Calibration valid until**:	
Assessment of light spill:	No light spill		
Instrumentation and method • Set up Rion NL52 at chest height on tripod • Attended monitoring undertaken for a period of 15 minutes.			
Results summary			

Location	Time	Observations	LAeq	LA90	LAmax
South east side of church between church and site boundary – (Appendix A)	11:33am	General: • Birds chirping • Vehicle ad pedestrians walking along East Street Specific observations • 2:51 bus passing • 3:36 birds chirping loudly • 5:54 worker walked passed at 1.5m • 7:04 HV reversing on site • 7:50 worker yelling out   	60.5	59.9	65.7

11 East Street, Fivedock – (Appendix B)	12:29pm	General: • Birds chirping • Vehicle ad pedestrians walking along East Street Specific observations • 1:39 Carparking, approx. 10m • 2:32 pedestrian walking past <1m • 2:56 school children screaming in distance (150m) & person on phone, approx 5m • 3:20 loud car accelerating and people walking past, approx. 8m. (this resulted in the Lmax of 74.5dB) • 4:41 car turning around, approx. 5m • 7:31 leaves blowing up street due to wind • 9:17 child and mother walk past <1m • 11:27 loud car drove past (approx. 3m) parked, (approx. 10m) and was left running until the end of the monitoring period of 15 minutes.    	53.9	48.0	74.5

Appendix A – monitoring location, next to St Albans Church



Appendix B – monitoring location, [redacted]

Noise monitoring report

Project: Sydney Metro West – Central Tunnelling Package	**Report No.** SOP_20230417
Data collected by: [redacted]	**Date**: Monday 17 April 2023
Time: 3:30 - 3:45pm (15min with the highest LAeq on that date)	
Was this monitoring event conducted in response to a complaint? No	
Location of construction activity (see Attachment A) Sydney Olympic Park Station Box	**Monitoring locations** Pullman 2nd level balcony

Observed construction activity

Shaft excavation: 4 excavators in station box, bulldozer, 2 excavators on surface managing stockpile and loading trucks, truck and dogs for spoil haulage

Nozzle work has not commenced.

Equivalent activity in DNVIS is 2e ripping

DNVIS predicted levels at Pullman Hotel are:

	2a	2b	2c	2d	2e	2f
Activity	Piling	Capping Beams	Active Anchors	OTR 0m-6m	Rip 6m-19m	Retention 3m-20m
Predicted LAeq15min dBA	66	67	69	71	75	70

Meteorological conditions			
Wind	13 km/h E		
Temperature (°C):	20.5 C	**Cloud cover**: cloudy	
Instrumentation details:	Sigicom S50 #14624	**Calibration valid until**:	26/6/23
Assessment of light spill:	N/A – day shift		

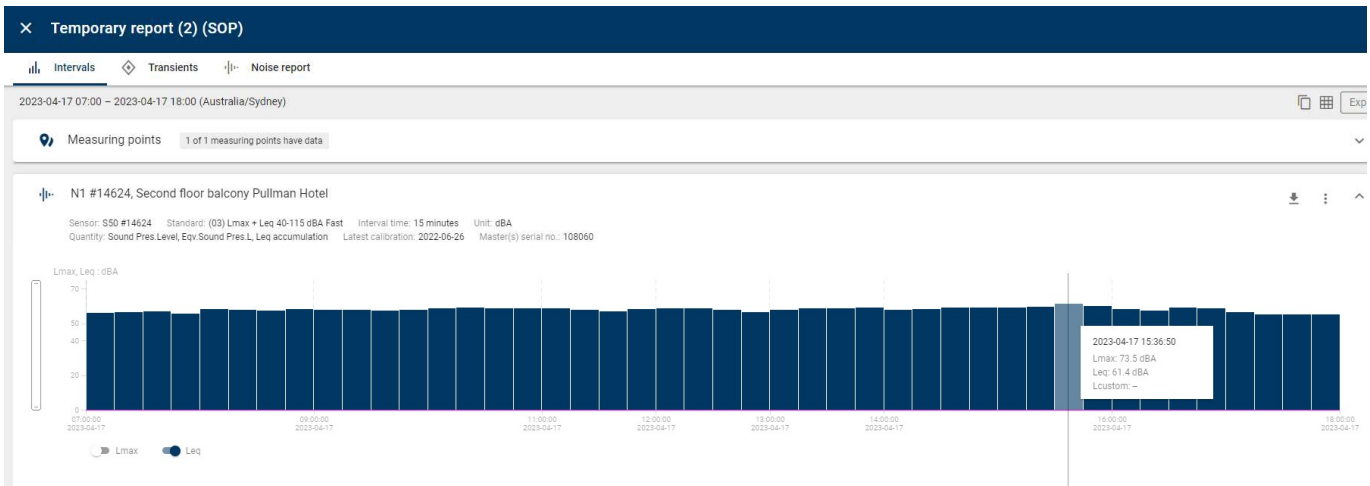
Instrumentation and method

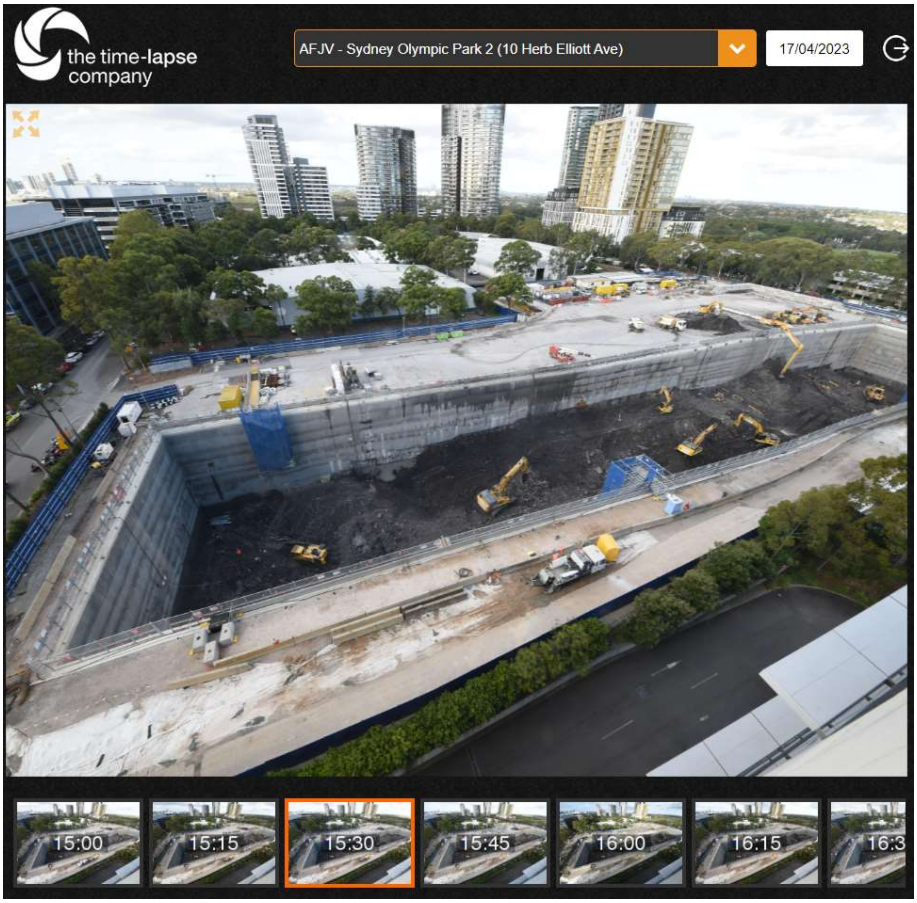
Unattended noise monitoring. Data collected from Sigicom online platform INFRA Net

S50 microphone positioned on tripod on balcony.

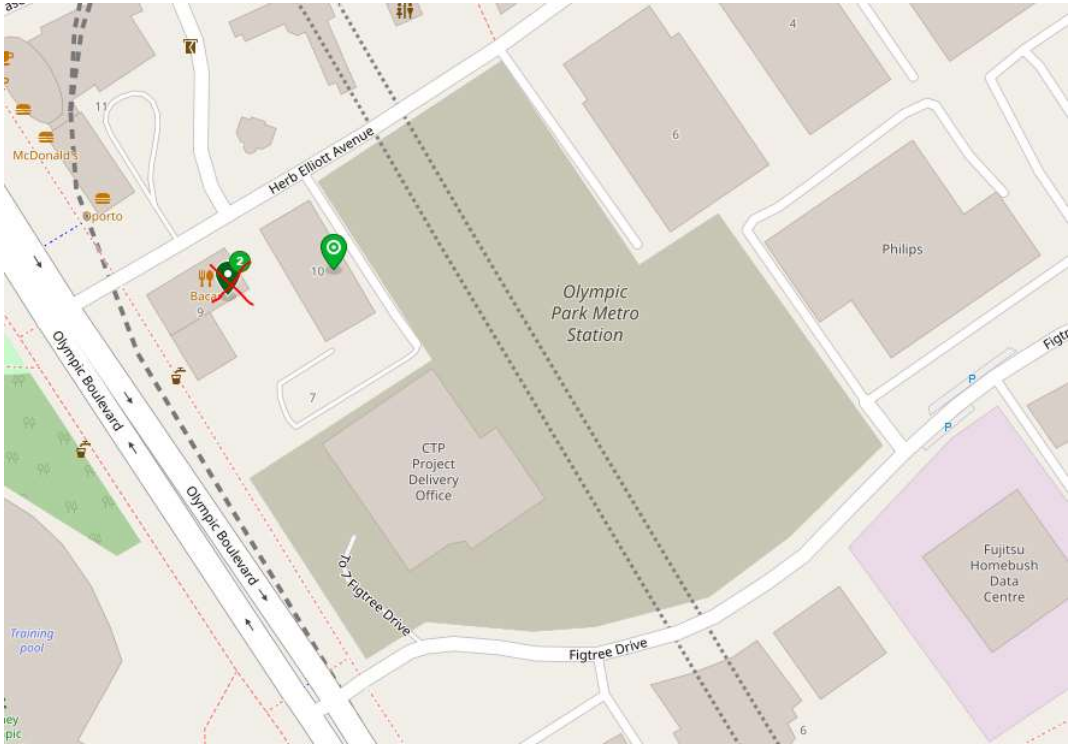
Reported value is the based on the 15min period with the highest LAeq 15min on 17/4/23 from 7am to 6pm.

Results summary



Location	Time	Observations	LAeq	LA90	LAmax
SOP	3:30-3:45 pm	Difference between predicted LAeq15min for rippable and actual is 13.6 dBA. 	61.4	-	73.5

Attachment A Monitoring and work locations



CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM36212

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Rion		
Type No:	NL-42	**Serial No:**	00145400
Mic. Type:	UC-52	**Serial No:**	149905
Pre-Amp. Type:	NH-24	**Serial No:**	35296

Owner: Ferrovial York Joint Venture
[redacted]

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 2. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1013	hPa ±1 hPa	**Date of Receipt :**	15/05/2023
Temperature	24	°C ±1° C	**Date of Calibration :**	23/05/2023
Relative Humidity	37	% ±5%	**Date of Issue :**	23/05/2023

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3.

CHECKED BY: ..KKB.. **AUTHORISED SIGNATURE:** .....Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

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www.acu-vib.com.au

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	*Clause*	*Result*
Absolute Calibration	10	Pass
Acoustical Frequency Weighting	12	Pass
Self-Generated Noise	11.1	Observed
Electrical Noise	11.2	Observed
Long Term Stability	15	Pass
Electrical Frequency Weightings	13	Pass
Frequency and Time Weightings	14	Pass
Reference Level Linearity	16	Pass
Range Level Linearity	17	Not Applicable
Toneburst	18	Pass
Peak C Sound Level	19	Pass
Overload Indicator	20	Pass
High Level Stability	21	Pass

Statement of Compliance: The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:-2013, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:-2013 because evidence was not publically available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 2 specifications in IEC 61672-1:-2013 and because the periodic tests of IEC 61672-3:-2013 cover only a limited subset of the specifications in IEC 61672-1:-2013.

A full technical report is available on request.

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM35782

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Svantek		
Type No:	SVAN-971	**Serial No:**	34933
Mic. Type:	7052E	**Serial No:**	56008
Pre-Amp. Type:	SV18	**Serial No:**	33351

Owner: Ferrovial York Joint Venture

[redacted]

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	995	hPa ±1 hPa	**Date of Receipt :**	29/03/2023
Temperature	25	°C ±1° C	**Date of Calibration :**	13/04/2023
Relative Humidity	50	% ±5%	**Date of Issue :**	14/04/2023

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Htin Soe

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www.acu-vib.com.au

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	*Clause*	*Result*
Absolute Calibration	10	Pass
Acoustical Frequency Weighting	12	Pass
Self-Generated Noise	11.1	Observed
Electrical Noise	11.2	Observed
Long Term Stability	15	Pass
Electrical Frequency Weightings	13	Pass
Frequency and Time Weightings	14	Pass
Reference Level Linearity	16	Pass
Range Level Linearity	17	Pass
Toneburst	18	Pass
Peak C Sound Level	19	Pass
Overload Indicator	20	Pass
High Level Stability	21	Pass

Statement of Compliance: The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC61672-1:2013.

A full technical report is available on request.

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: C36211

EQUIPMENT TESTED : Sound Level Calibrator

Manufacturer: Pulsar
Type No: 106 **Serial No:** 70390
Owner: Ferrovial York Joint Venture
[redacted]

Tests Performed: Measured Output Pressure level, Frequency & Distortion
Comments: See Details overleaf. All Test Passed.

Parameter	Pre-Adj	Adj Y/N	Output: (dB re 20 µPa)	Frequency (Hz)	THD&N (%)
Level:	NA	N	94.10 dB	1000.23 Hz	0.79 %
Uncertainty			±0.11 dB	±0.05%	±0.20 %
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure 1013 hPa ±1 hPa
Temperature 24 °C ±1° C
Relative Humidity 36 % ±5%

Date of Receipt : 15/05/2023
Date of Calibration : 23/05/2023
Date of Issue : 23/05/2023

Acu-Vib Test Procedure: AVP02 (Calibrators)
Test Method: AS IEC 60942 - 2017

CHECKED BY: .....

AUTHORISED SIGNATURE: ..... Hein Soe

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The Calibrator described in this report has been tested to the requirements of the standard IEC 60942-[Ed 4]:2017-11.
The tests described in Annex B of the standard (Periodic tests) were carried out under the environmental conditions listed above to the following clauses:

Clause	**Test description**
B4.6	Sound Pressure Level (By comparison with a reference calibrator).
B4.7	Frequency (By measurement with a calibrated frequency meter).
B4.8	Total distortion and noise. (By measurement with a calibrated Noise and Distortion meter).

Notes:

1. The calibrator was calibrated with the main axis vertical and facing down.
2. No corrections have been made for atmospheric pressure, temperature, or humidity.

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

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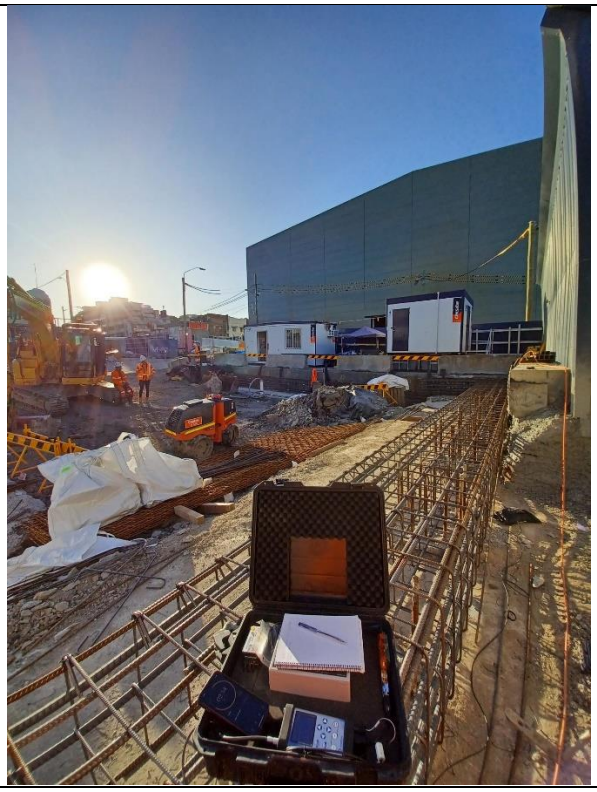
APPENDIX B - VIBRATION MONITORING LOCATIONS AND RESULTS

Vibration Monitoring

Date	Time	Site	Attended/Unattended	Type/Model number	Serial No.	Calibration due	Duration of monitoring	Source location	Measurement location	Distance to source (m)	Works being undertaken	Preferred Criteria (mm/s)	PPV (mm/s)	Frequency (Hz)	Vibration Dose Value (VDV mm/s1.75)	Below criteria (Y/N)	Comments
16/01/2023	9:03am	Burwood South	Unattended	C22	107769, 107775 & 106849	31/03/2025	Real time	Southern shaft	[redacted]	~2m	Demolition - awning removal.	7.5	8.33	97.5	N/A	N	Automated text notification received during works. Workers were contacted and work ceased immediately and investigation undertaken. A segment of the awning the sub-contractors had been demolished had swung back and made contact with a wall at the time of the exceedance. Once the source of vibration was confirmed, the delta was instructed to re-commence work, while the team observed for a period of 15 minutes for any further vibration exceedances while the demolition continued. No further exceedances were recorded. Given the frequency of the event the PPV is unlikely to cause cosmetic damage.
18/01/2023	9:03am	Burwood South	Unattended	C22	107769, 107775 & 106849	31/03/2025	Real time	Southern shaft	[redacted]	~2m	Cleaning of demolition debris from the concrete slab.	7.5	19.8	97.5	N/A	N	Automated text notification received during works. Workers were contacted and work ceased immediately and investigation undertaken. The foreman noted his crew had been using an excavator bucket to clean demolition debris from the concrete slab. It was most likely that the excavator bucket made contact with concrete slab during end of shift clean up. No further exceedances were identified during this activity. Given the frequency of the event the PPV is unlikely to cause cosmetic damage.
20/01/2023	10:22am	Burwood South	Unattended	C22	107769, 107775 & 106849	31/03/2025	Real time	Southern shaft	[redacted]	~5m	Demolition - lifting section of concrete slab.	7.5	12.5	137	N/A	N	Automated text notification received during works. Workers were contacted and work ceased immediately and investigation undertaken. Revised methodology implemented including additional saw cutting. No further exceedances recorded after cutting. Given the frequency of the event the PPV is unlikely to cause cosmetic damage.
13/03/2023	1:35pm	Burwood South	Unattended	C22	107769, 107775 & 106849	31/03/2025	Real time	Southern shaft	[redacted]	~5m	Excavation of southern shaft to expose piles	7.5	10.9	137	N/A	N	Automated text notification received during works. Workers were contacted and work ceased immediately and investigation undertaken. After speaking to the excavator operator, he will continue using the smaller bucket for detailed excavation around the piles to ensure minimal contact is made with the piles. No further exceedances were recorded for this activity. Given the frequency of the event the PPV is unlikely to cause cosmetic damage.
10/05/2023	3:58pm	Burwood South	Attended	Svan958	81118	13/02/2024	2 min per test	Southern shaft	[redacted]	Various	Remote roller and 20T excavator	7.5	10.8		N/A	N	Refer to monitoring report. The monitoring event was a trial during use of a remote roller and 20T excavator. One spike was recorded when the excavator bucket contacted concrete blinding, however, this was part of the planned trial and not a reflection of the typical work scope. No exceedances were recorded during use of the remote roller.
08-15/5/23	0:00	The Bays	Unattended	C22	107769, 107775 & 106849	31/03/2025	8 days	TBM tunnel	WBPS	~40	TBM tunnel excavation	2.5	8.55	256	N/A	N	1 spike of 8.55 mm/s but the frequency was 256 Hz which is outside the typical frequency expected for a TBM. It's more likely to have been caused by a movement in close proximity to the unit. All other results were below 2 mm/s.
15-22/5/23	0:00	The Bays	Unattended	C22	107769, 107775 & 106849	31/03/2025	8 days	TBM tunnel	WBPS	>50	TBM tunnel excavation	2.5	2.85	108	N/A	N	Criteria of 2.5mm/s is conservative. Building is expected to be structurally sound. There was 1 spike of 2.85 mm/s but the frequency for this event was 108-228 Hz which is outside the typical frequency expected for a TBM. Additionally the spike occurred when the TBM was >50m from the geophone and results didn't increase as the TBM approached. All other results were below 1.2 mm/s.
22-29/5/23	0:00	The Bays	Unattended	C22	107769, 107775 & 106849	31/03/2025	8 days	TBM tunnel	WBPS	~40	TBM tunnel excavation	2.5	1	36.6	N/A	Y	Below criteria
29/5-05/06/23	0:00	The Bays	Unattended	C22	107769, 107775 & 106849	31/03/2025	8 days	TBM tunnel	WBPS	~40	TBM tunnel excavation	2.5	2.2	205	N/A	Y	Below criteria. PPV has frequency outside typical range for TBM and is likely to be from a non-CTP source
05-12/06/23	0:00	The Bays	Unattended	C22	107769, 107775 & 106849	31/03/2025	8 days	TBM tunnel	WBPS	~40	TBM tunnel excavation	2.5	3.5	85.3	N/A	N	There was a one of spike of 3.5mm/s but the frequency was 102 Hz which is outside the typical frequency expected for a TBM. The PPV was recorded on 8th June at 7:58am on the WBPS_3 unit. It's more likely to have been caused by a movement in close proximity to the unit, considering the TBM is currently not working.
12-19/06/23	0:00	The Bays	Unattended	C22	107769, 107775 & 106849	31/03/2025	8 days	TBM tunnel	WBPS	25	TBM tunnel excavation	2.5	1.7	81.9	N/A	Y	TBM passed under Robert St away from WBPS during this period.

Attended Vibration Monitoring Trail – Royal Enfield

Date	Location	Photo	Comment
10.05.23	[redacted]	 	Geophone placed on 150mm blinding. Black sandbag was also placed on top to ensure sufficient contact with concrete blinding.

10.05.23	[redacted]		• Monitoring was undertaken at 5m using a remote roller. Rolling was undertaken for a period of 3 minutes. • Highest recorded PPV during monitoring was 1.758mm/s, as shown in appendix A
10.05.23	[redacted]		• Monitoring was undertaken at 10m using a remote roller. Rolling was undertaken for a period of 3 minutes. • Highest recorded PPV during monitoring was 0.785mm/s, as shown in appendix A

10.05.23	[redacted]		• Monitoring was undertaken at 15m using a remote roller. Rolling was undertaken for a period of 3 minutes. • Highest recorded PPV during monitoring was 0.550mm/s, as shown in appendix A
10.05.23	[redacted]		• Monitoring was undertaken at 5m with the 20T excavator hitting the back of the bucket on the ground several times • Highest recorded PPV during monitoring was 1.758mm/s, as shown in appendix B

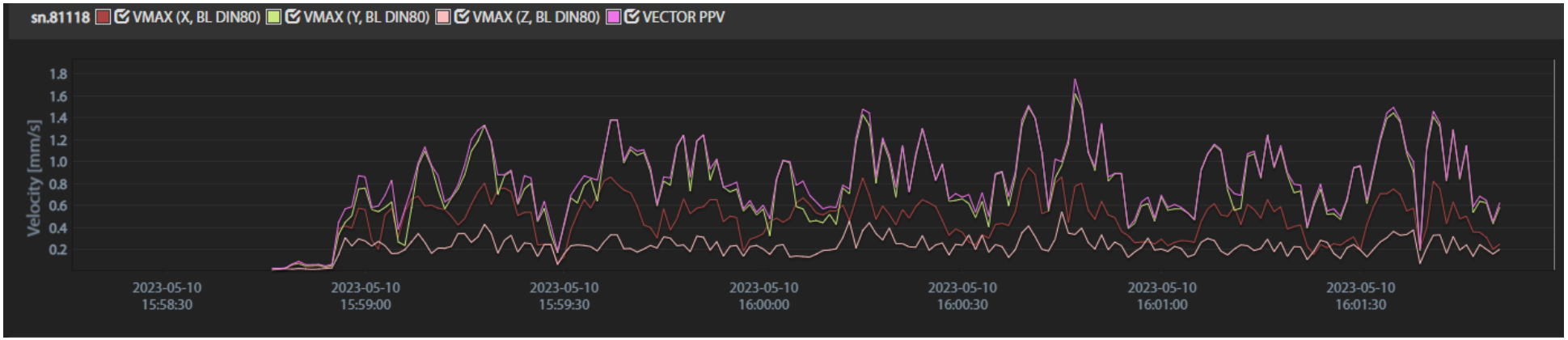
10.05.23	[redacted]		• Monitoring was undertaken at 2m with the 20T excavator hitting the back of the bucket on the blinding several times • Highest recorded PPV during monitoring was 10.839mm/s, as shown in appendix B

Attended Monitoring Notes:

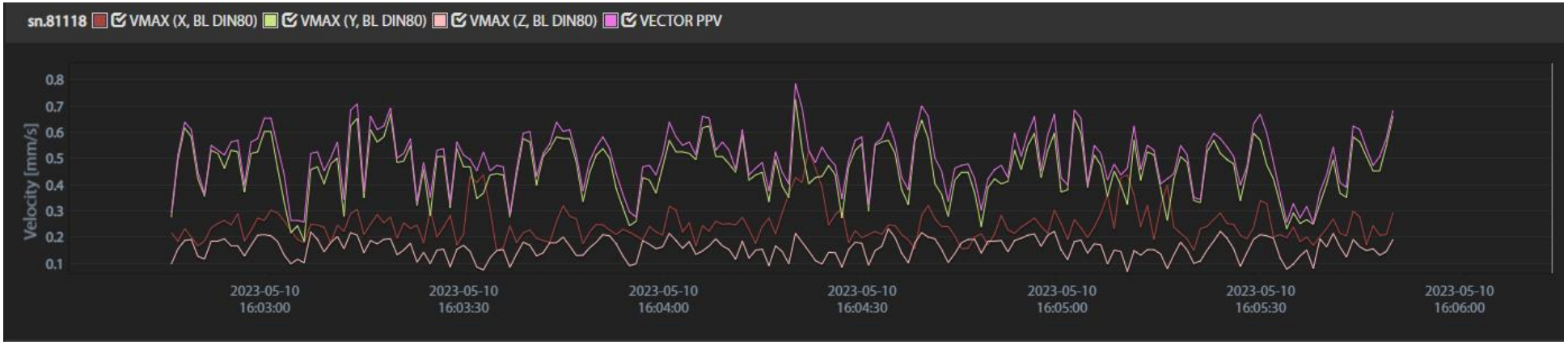
On 10 May 2023 attended vibration monitoring was undertaken to understand potential sources of vibration from the current works being undertaken on the southern shaft at the BWD site. Despite one recorded exceedance resulting from the 20T excavator bucket contacting the concrete blinding slab, no possible sources of vibration were identified from the current work scope on the southern shaft. The one exceedance is not a reflection of the work scope, although reflects a potential source in the unlikely event. As new works scopes commence on the southern shaft, additional trails will be undertaken to ensure works are being undertaken in accordance with the relevant vibration criteria and potential safe working distances.

Appendix A

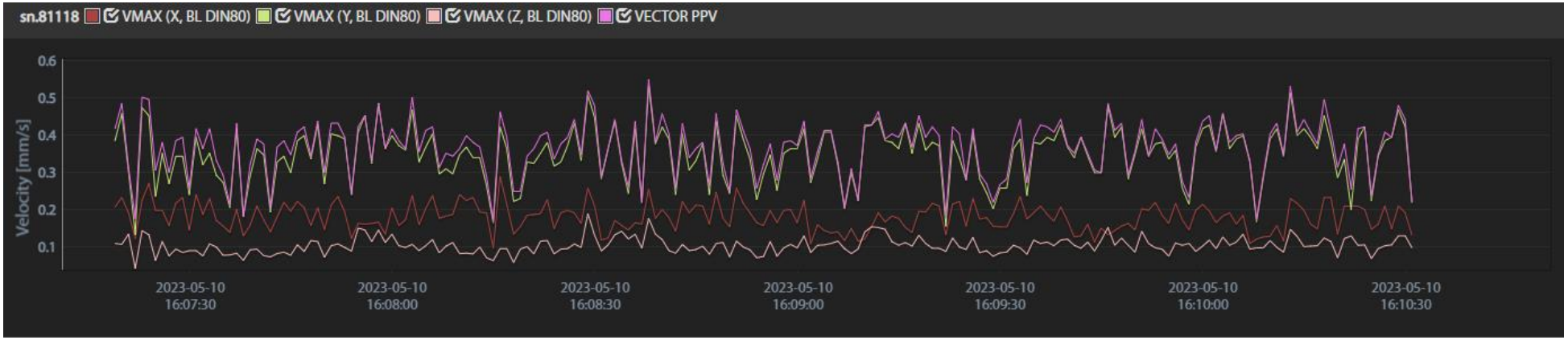
Remote Roller Monitoring results – 5m



Remote Roller Monitoring results – 10m

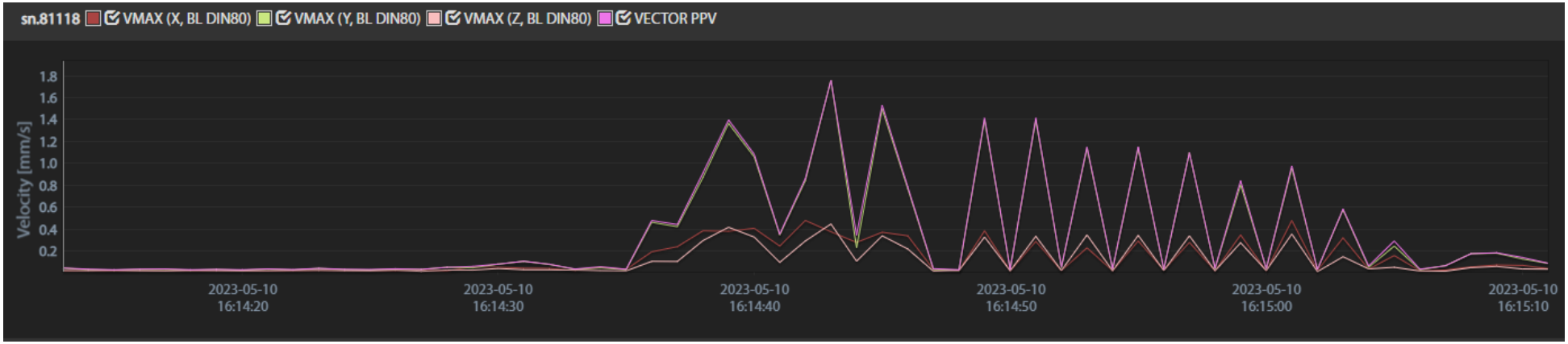


Remote Roller Monitoring results – 15m

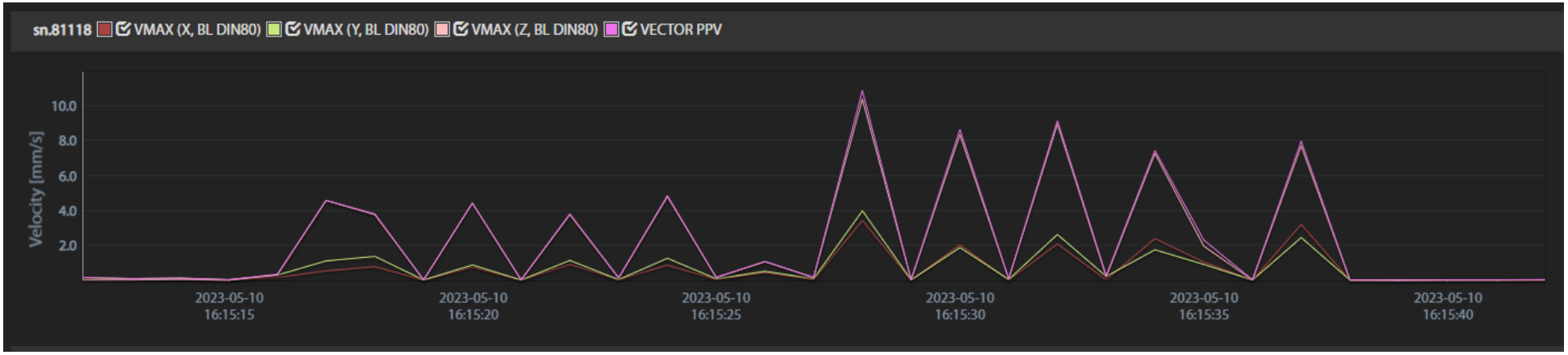


Appendix B

Excavator Bucket monitoring results – 5m



Excavator Bucket monitoring results – 2m



AFJV Central Tunnel Package

Vibration Monitoring Event Report

Monitoring Information			
Test Location	White Bay Power Station, eastern boundary WBPS_1, WBPS_2 & WBPS_3	Unsound heritage structure	
Works Monitoring	TBM	Distance between geophone and works	~ 40m (underground)
Conducted by	[redacted]	Attended monitoring	No
Date	08-15/05/2023		

Instrumentation & Test Procedure			
Instrument	Sigicom C22		
Calibrator	Sigicom		
Calibration Date	31/3/23	Calibration Due	31/3/25
Monitor Serial #	107769, 107775 & 106849		

Preferred Criteria (circle criteria relevant to monitoring event)

	Reinforced or framed structures	Unreinforced or light framed structures	Heritage structurally sound	Heritage structurally unsound	Residential human comfort Day	Residential human comfort Night
Peak Particle Velocity (PPV mm/s)	25	7.5	7.5	2.5	-	-
Vibration Dose Value (VDV $mm/s^{1.75}$)	-	-	-	-	200	130

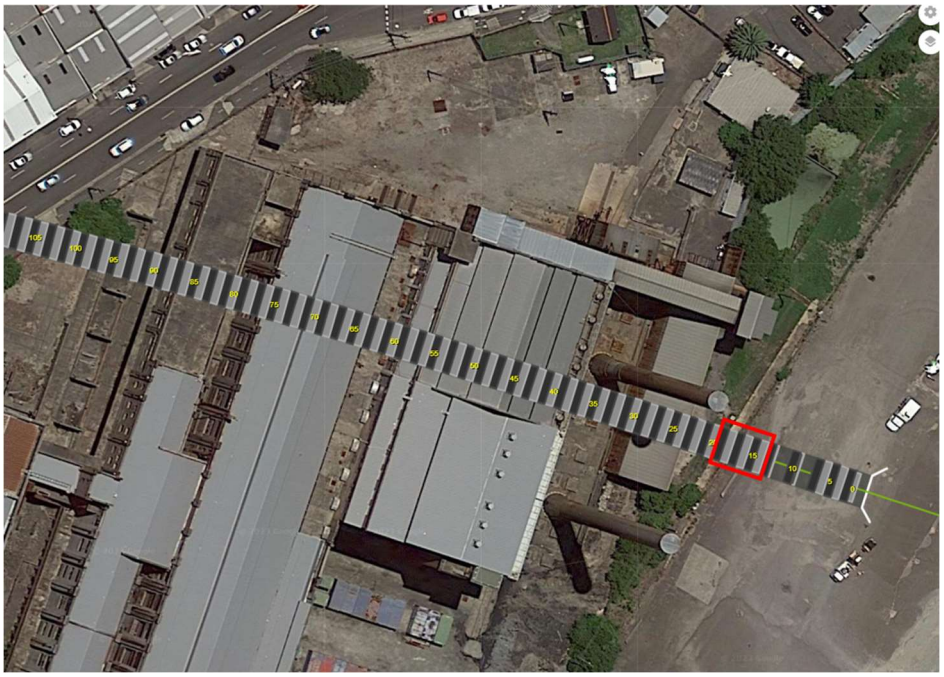
Monitoring Results

Start Time	00:00	Duration		8 days
Trigger value (mm/s)	2.5	# of vibration triggers		1

	Trans		Vert		Long	
	Value	Freq (Hz)	Value	Freq (Hz)	Value	Freq (Hz)
Peak Particle Velocity (PPV mm/s)	6.25	256	8.55	256	2.85	341
Vibration Dose Value (VDV $mm/s^{1.75}$)	-	-	-	-	-	

Below preferred criteria?	No

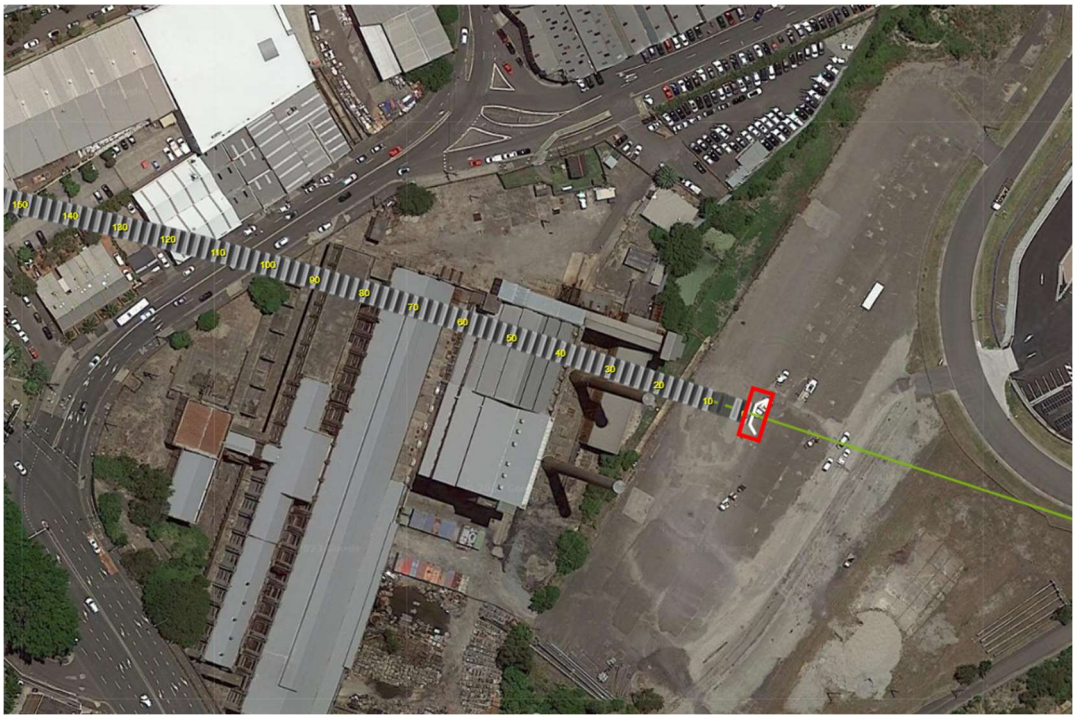
AFJV Central Tunnel Package

Notes and Diagram/Map
One spike of 8.55 mm/s but the frequency was 256 Hz which is outside the typical frequency expected for a TBM. It's more likely to have been caused by a movement in close proximity to the unit. All other results were below 2 mm/s. PPV occurred at 8:32am on 9/5/23 at WBPS_1 Location of monitors:    **TBM04:** **09/05/2023 – Location during the whole day** 1. DS- Tunnel distance: 3,415.03 - 3,419.16 2. NS- Tunnel distance: 3,419.16 - 3,424.24   

AFJV Central Tunnel Package

TBM03:

09/05/2023 – Location during the whole day



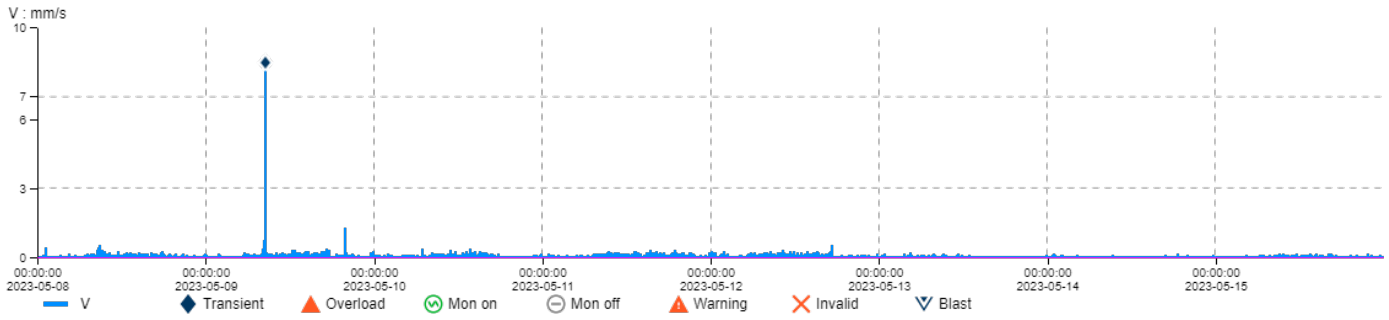
Multi report

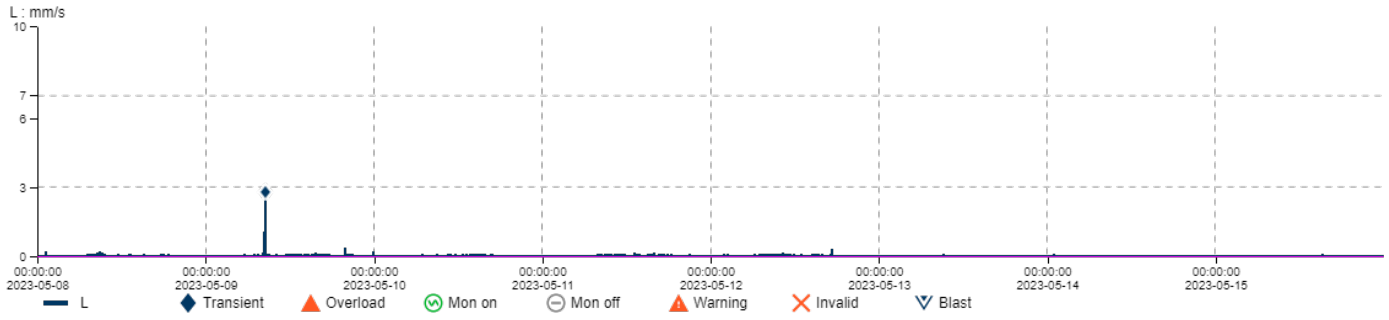
Project	TBY
Project maintainer	-
Time frame	2023-05-08 00:00 - 2023-05-15 23:59 (Australia/Sydney)

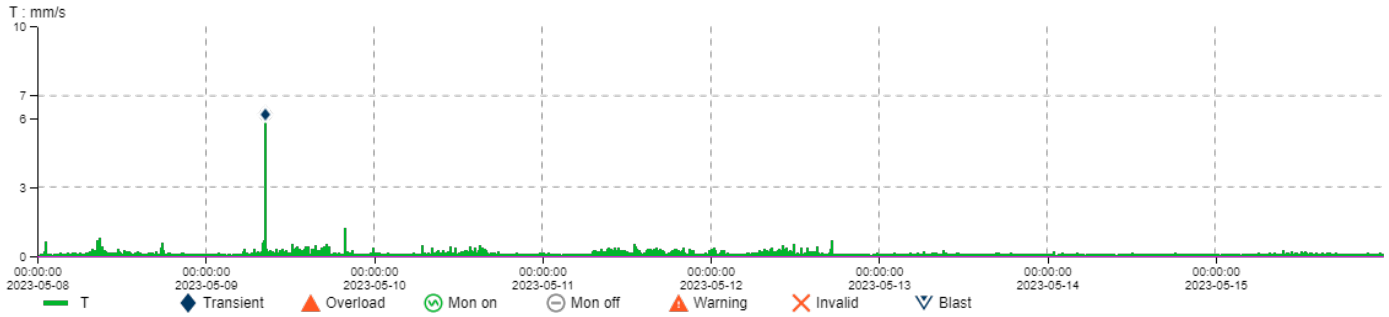
NB!

Chart data is aggregated by 4 minutes.

WBPS_1, East Boundary, C22, S/N: 106849, Calibrated: 2023-03-31, (18A) DIN4150-3 Anlage 250mm/s 1-315Hz

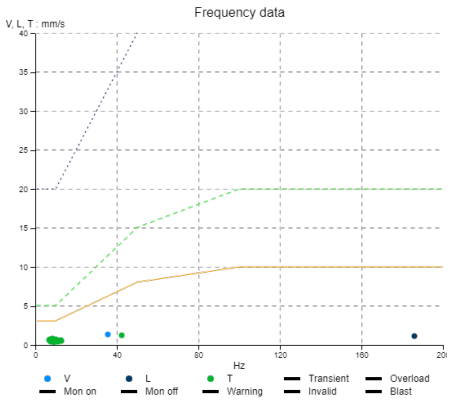






X-span	2023-05-08 00:00 - 2023-05-15 23:59
Y-span	V, L, T : mm/s: 0 - 10

	V	L	T
Max	8.55 mm/s	2.85 mm/s	6.25 mm/s
Date	2023-05-09	2023-05-09	2023-05-09
Time	08:32:00	08:32:00	08:32:00
Hz	256	341	256



Multi report

Project	TBY
Project maintainer	-
Time frame	2023-05-08 00:00 - 2023-05-15 23:59 (Australia/Sydney)

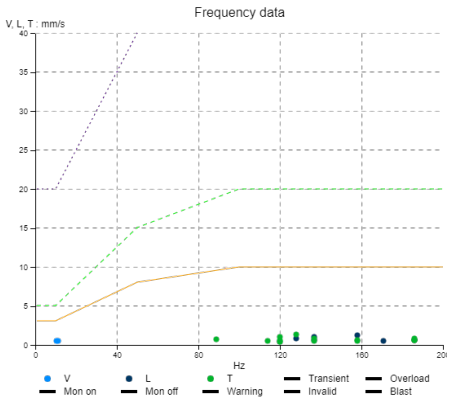
NB!

Chart data is aggregated by 4 minutes.

WBPS_2, Ground Floor, C22, S/N: 107775, Calibrated: 2023-04-01, (18A) DIN4150-3 Anlage 250mm/s 1-315Hz

X-span	2023-05-08 00:00 - 2023-05-15 23:59
Y-span	V, L, T : mm/s: 0 - 2

	V	L	T
Max	0.75 mm/s	1.15 mm/s	1.25 mm/s
Date	2023-05-08	2023-05-08	2023-05-12
Time	07:40:00	12:00:00	13:44:00
Hz	341	158	128



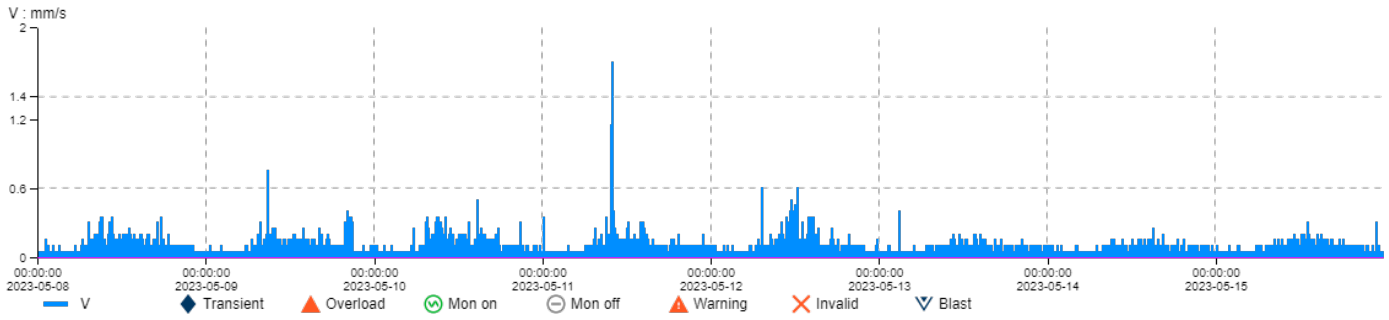
Multi report

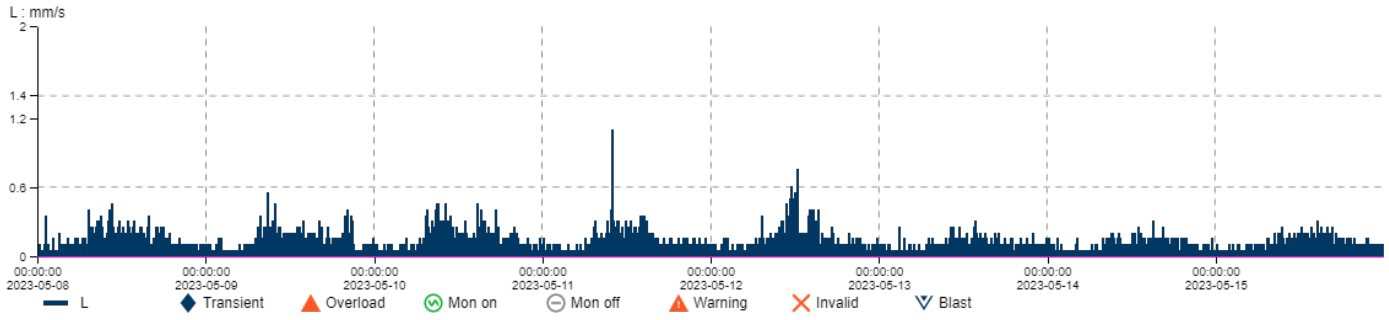
Project	TBY
Project maintainer	-
Time frame	2023-05-08 00:00 - 2023-05-15 23:59 (Australia/Sydney)

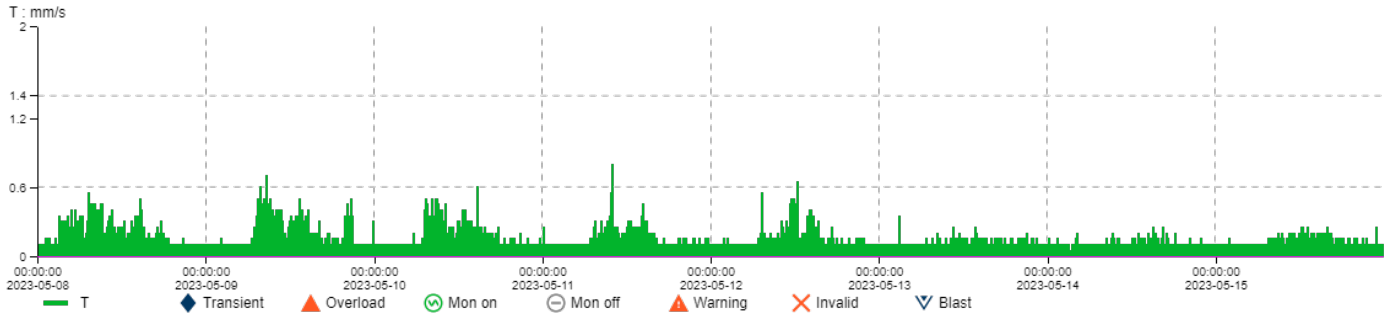
NB!

Chart data is aggregated by 4 minutes.

WBPS_3, Upper Floor, C22, S/N: 107769, Calibrated: 2023-03-31, (18A) DIN4150-3 Anlage 250mm/s 1-315Hz

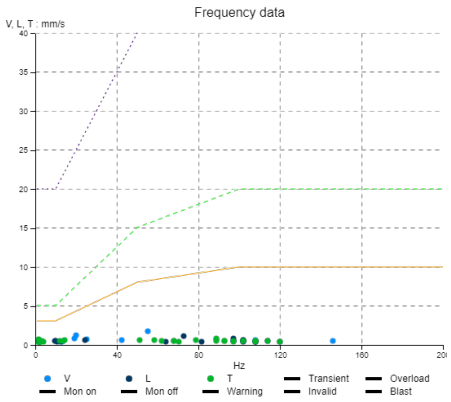






X-span	2023-05-08 00:00 - 2023-05-15 23:59
Y-span	V, L, T : mm/s: 0 - 2

	V	L	T
Max	1.7 mm/s	1.1 mm/s	0.8 mm/s
Date	2023-05-11	2023-05-11	2023-05-11
Time	10:04:00	10:04:00	10:04:00
Hz	55.4	73.1	89



AFJV Central Tunnel Package

Vibration Monitoring Event Report

Monitoring Information			
Test Location	White Bay Power Station, eastern boundary WBPS_1, WBPS_2 & WBPS_3	Unsound heritage structure	
Works Monitoring	TBM	Distance between geophone and works	>50 (underground)
Conducted by	[redacted]	Attended monitoring	No
Date	15-22/05/2023		

Instrumentation & Test Procedure			
Instrument	Sigicom C22		
Calibrator	Sigicom		
Calibration Date	31/3/23	Calibration Due	31/3/25
Monitor Serial #	107769, 107775 & 106849		

Preferred Criteria (circle criteria relevant to monitoring event)

	Reinforced or framed structures	Unreinforced or light framed structures	Heritage structurally sound	Heritage structurally unsound	Residential human comfort Day	Residential human comfort Night
Peak Particle Velocity (PPV mm/s)	25	7.5	7.5	2.5	-	-
Vibration Dose Value (VDV $mm/s^{1.75}$)	-	-	-	-	200	130

Monitoring Results

Start Time	00:00	Duration		8 days
Trigger value (mm/s)	2.5	# of vibration triggers		1

	Trans		Vert		Long	
	Value	Freq (Hz)	Value	Freq (Hz)	Value	Freq (Hz)
Peak Particle Velocity (PPV mm/s)	1.3	205	2.85	108	1.25	228
Vibration Dose Value (VDV $mm/s^{1.75}$)	-	-	-	-	-	

AFJV Central Tunnel Package

Below preferred criteria?	No Criteria of 2.5mm/s is conservative. Building is expected to be structurally sound.

Notes and Diagram/Map

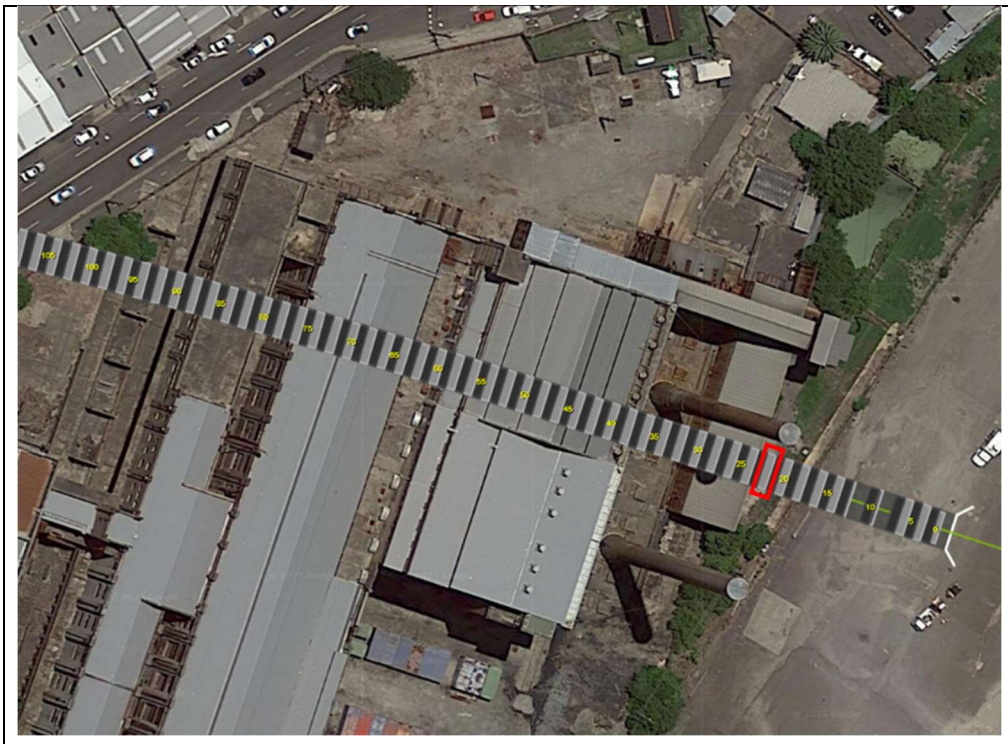
There was 1 spike of 2.85 mm/s but the frequency for this event was 108-228 Hz which is outside the typical frequency expected for a TBM. Additionally the spike occurred when the TBM was >50m from the geophone and results didn't increase as the TBM approached. All other results were below 1.2 mm/s.
PPV occurred at 9:16am on 16/5/23 at WBPS_3

Location of monitors:

TBM4
16/05/2023- Location during the whole day

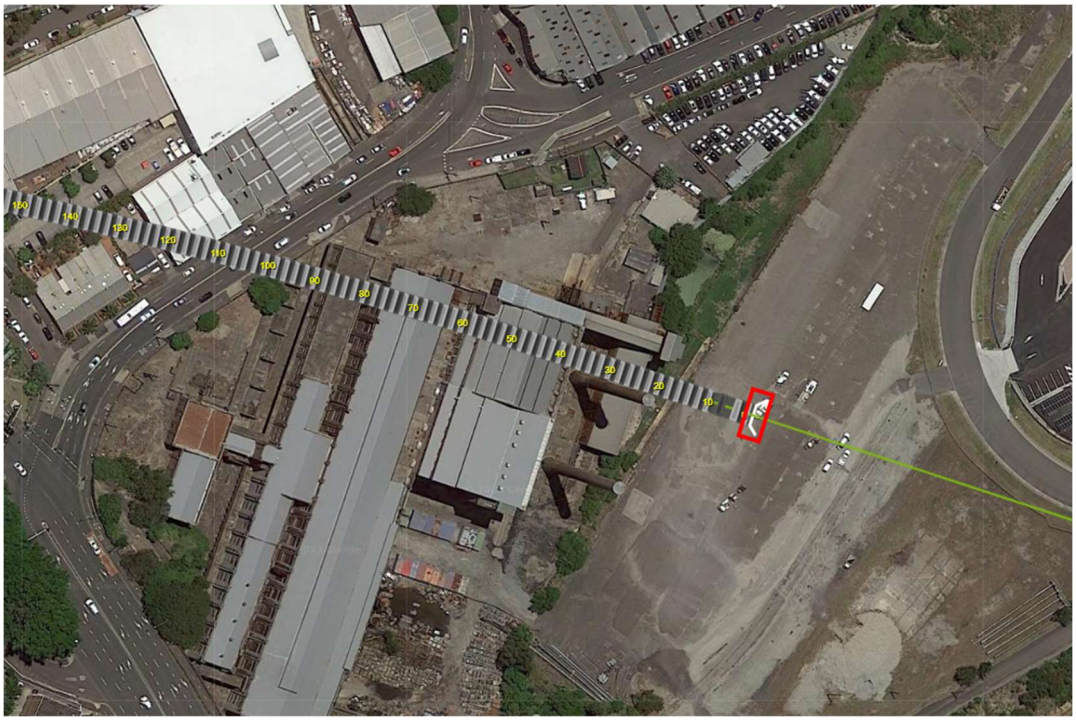
1. DS-Tunnel distance: 3,430.89 - 3,430.89
2. NS- Tunnel distance: 3,430.89 - 3,430.89

AFJV Central Tunnel Package



TBM3: 16/05/23 – Location during the whole day

1. DS- Tunnel distance: 3,381.17 - 3,383.54
2. NS- Tunnel distance: 3,383.54 - 3,388.8



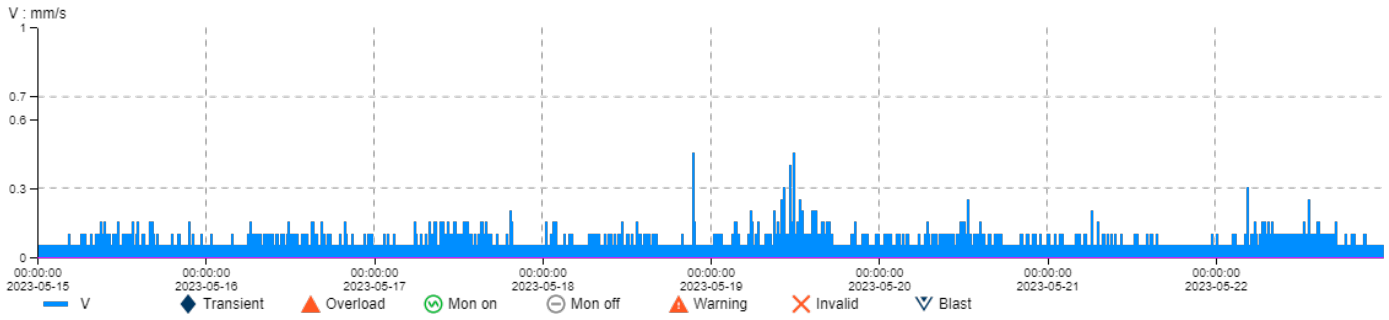
Multi report

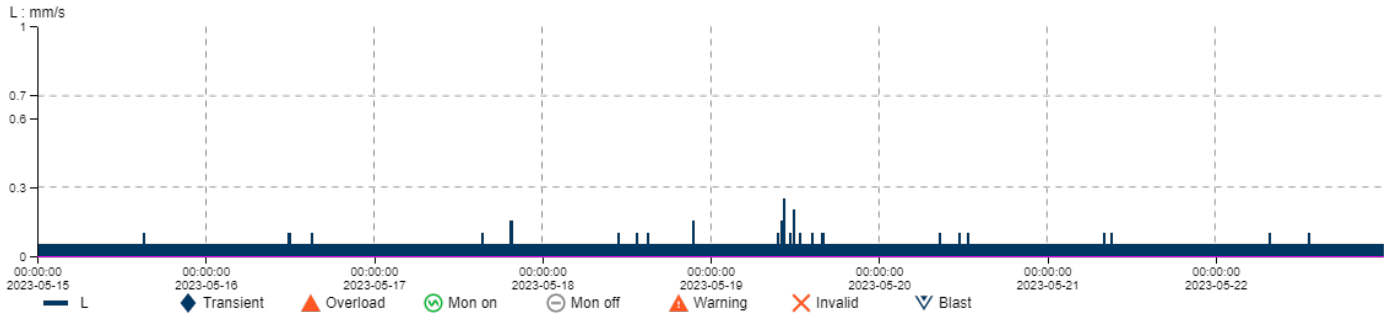
Project	TBY
Project maintainer	-
Time frame	2023-05-15 00:00 - 2023-05-22 23:59 (Australia/Sydney)

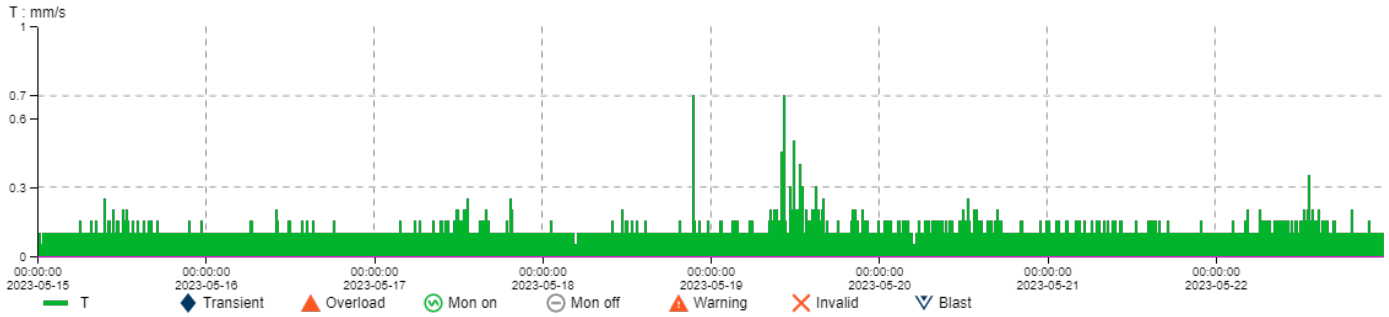
NB!

Chart data is aggregated by 4 minutes.

WBPS_1, East Boundary, C22, S/N: 106849, Calibrated: 2023-03-31, (18A) DIN4150-3 Anlage 250mm/s 1-315Hz

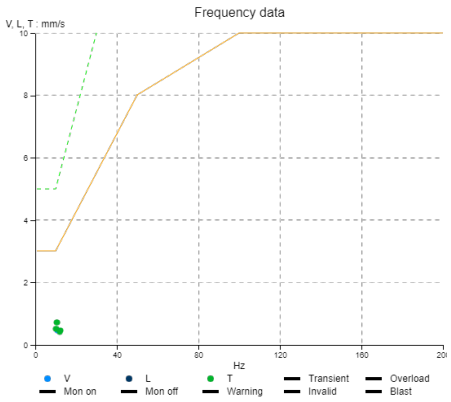






X-span	2023-05-15 00:00 - 2023-05-22 23:59
Y-span	V, L, T : mm/s: 0 - 1

	V	L	T
Max	0.45 mm/s	0.25 mm/s	0.7 mm/s
Date	2023-05-18	2023-05-19	2023-05-18
Time	21:32:00	10:32:00	21:32:00
Hz	11.5		10.7



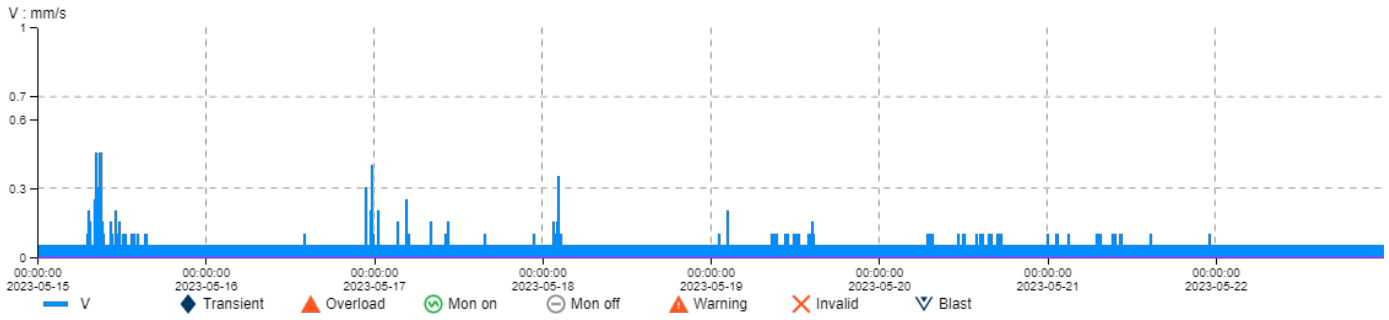
Multi report

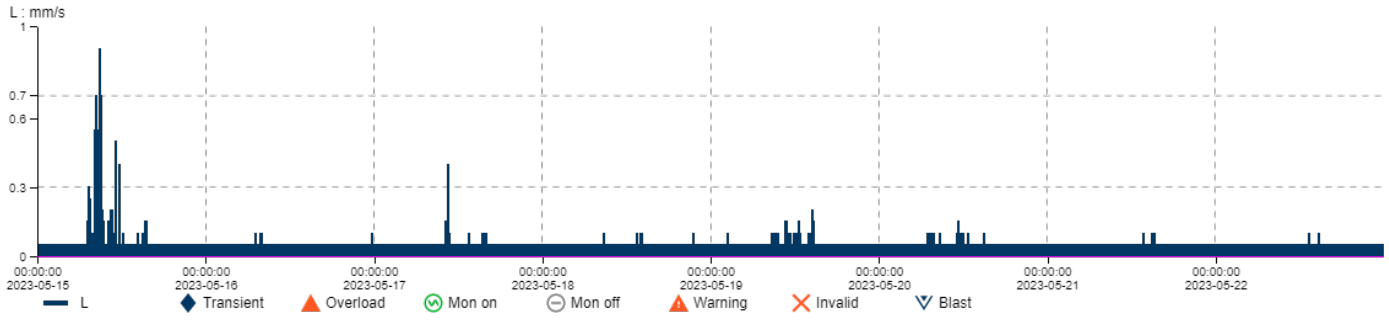
Project	TBY
Project maintainer	-
Time frame	2023-05-15 00:00 - 2023-05-22 23:59 (Australia/Sydney)

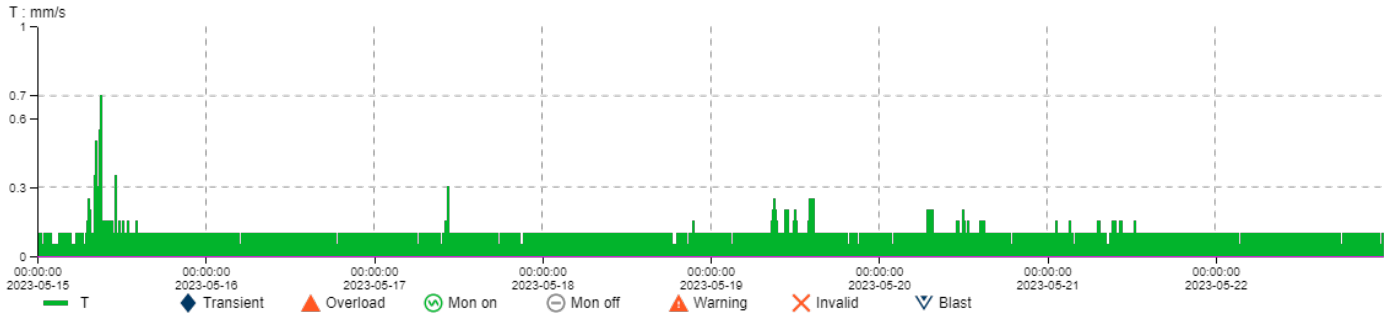
NB!

Chart data is aggregated by 4 minutes.

WBPS_2, Ground Floor, C22, S/N: 107775, Calibrated: 2023-04-01, (18A) DIN4150-3 Anlage 250mm/s 1-315Hz

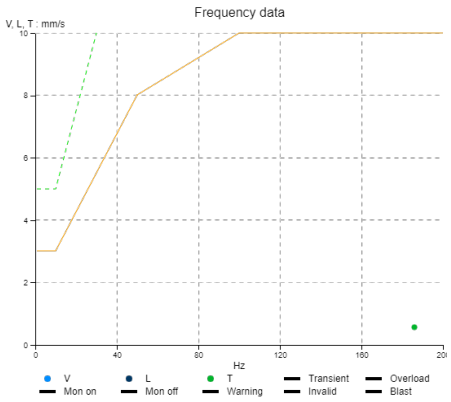






X-span	2023-05-15 00:00 - 2023-05-22 23:59
Y-span	V, L, T : mm/s: 0 - 1

	V	L	T
Max	0.45 mm/s	0.9 mm/s	0.7 mm/s
Date	2023-05-15	2023-05-15	2023-05-15
Time	08:24:00	08:52:00	09:00:00
Hz	293	205	341



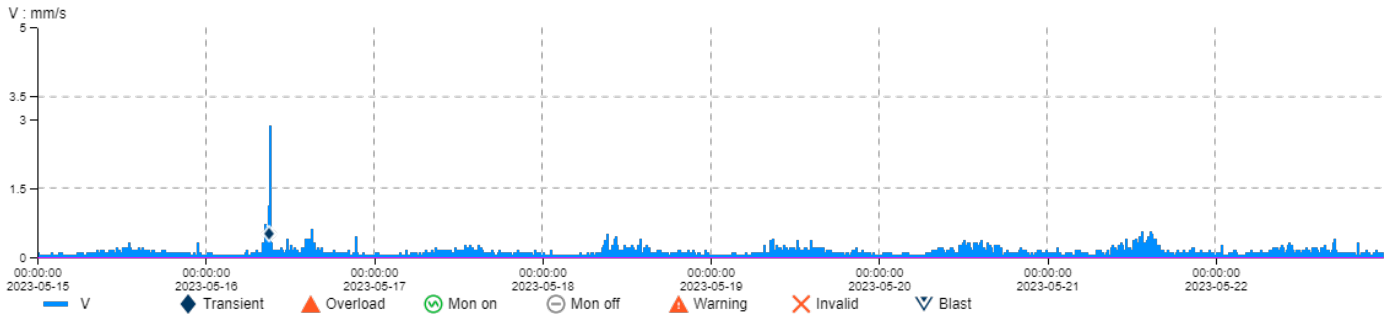
Multi report

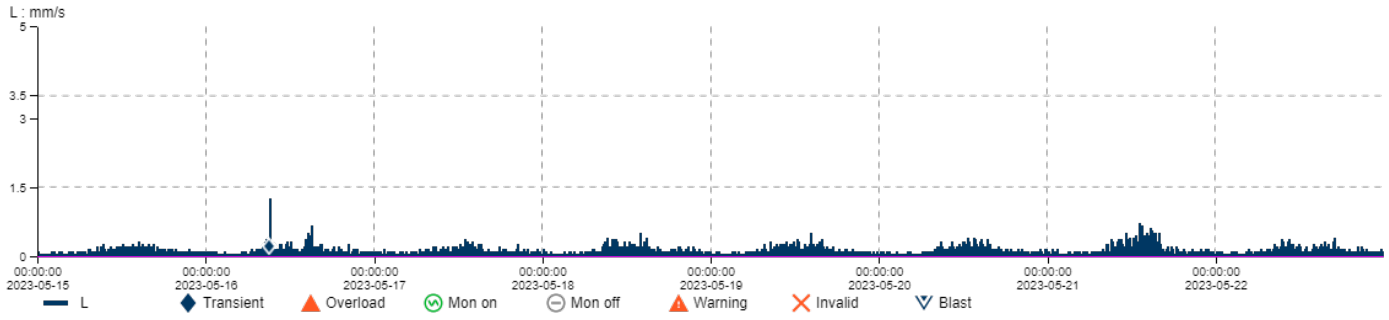
Project	TBY
Project maintainer	-
Time frame	2023-05-15 00:00 - 2023-05-22 23:59 (Australia/Sydney)

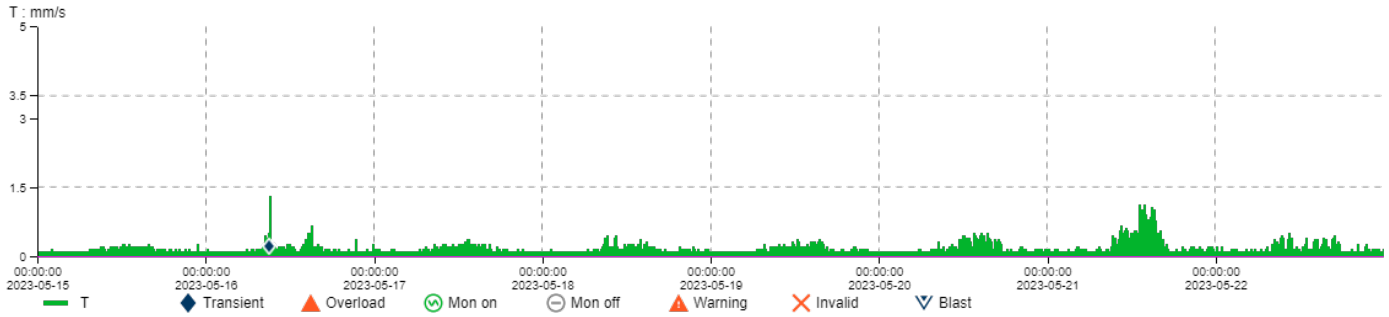
NB!

Chart data is aggregated by 4 minutes.

WBPS_3, Upper Floor, C22, S/N: 107769, Calibrated: 2023-03-31, (18A) DIN4150-3 Anlage 250mm/s 1-315Hz

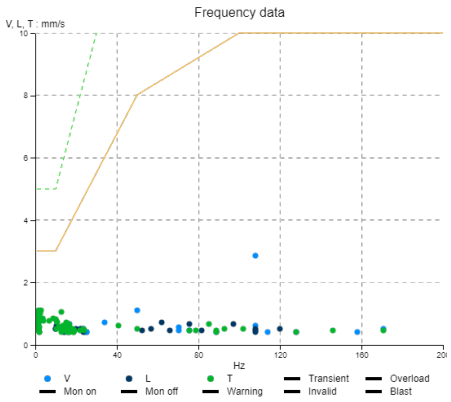






X-span	2023-05-15 00:00 - 2023-05-22 23:59
Y-span	V, L, T : mm/s: 0 - 5

	V	L	T
Max	2.85 mm/s	1.25 mm/s	1.3 mm/s
Date	2023-05-16	2023-05-16	2023-05-16
Time	09:16:00	09:16:00	09:16:00
Hz	108	228	205



AFJV Central Tunnel Package

Vibration Monitoring Event Report

Monitoring Information			
Test Location	White Bay Power Station, eastern boundary WBPS_1, WBPS_2 & WBPS_3	Unsound heritage structure	
Works Monitoring	TBM	Distance between geophone and works	~40 (underground)
Conducted by	[redacted]	Attended monitoring	No
Date	22-29/05/2023		

Instrumentation & Test Procedure			
Instrument	Sigicom C22		
Calibrator	Sigicom		
Calibration Date	31/3/23	Calibration Due	31/3/25
Monitor Serial #	107769, 107775 & 106849		

Preferred Criteria (circle criteria relevant to monitoring event)

	Reinforced or framed structures	Unreinforced or light framed structures	Heritage structurally sound	Heritage structurally unsound	Residential human comfort Day	Residential human comfort Night
Peak Particle Velocity (PPV mm/s)	25	7.5	7.5	2.5	-	-
Vibration Dose Value (VDV $mm/s^{1.75}$)	-	-	-	-	200	130

Monitoring Results

Start Time	00:00	Duration		8 days
Trigger value (mm/s)	2.5	# of vibration triggers		0

	Trans		Vert		Long	
	Value	Freq (Hz)	Value	Freq (Hz)	Value	Freq (Hz)
Peak Particle Velocity (PPV mm/s)	1	36.6	0.75	53.9	0.1	Not given
Vibration Dose Value (VDV $mm/s^{1.75}$)	-	-	-	-	-	

AFJV Central Tunnel Package

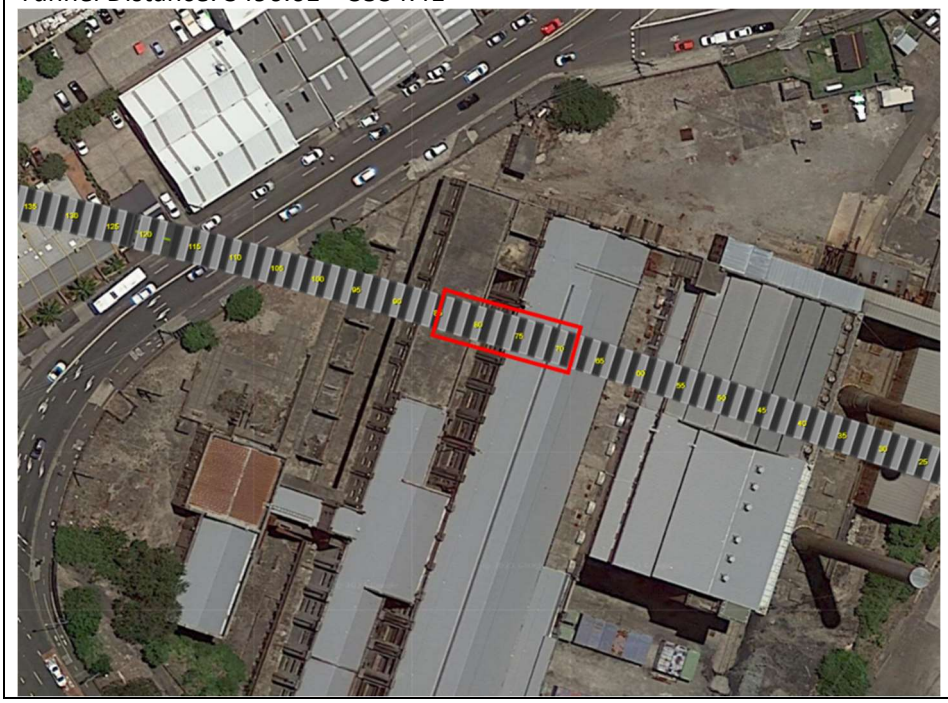
Below preferred criteria?	Yes

Notes and Diagram/Map

PPV occurred at 5:36pm on 29/5/23 at WBPS_1

Location of monitors:

TBM4:
22/05/23 till 29/05/23 – Location during that week
Tunnel Distance: 3496.61 – 3534.41



AFJV Central Tunnel Package

TBM3
22/05/23 till 29/05/23 – Location during that week
Tunnel distance: 3383.54 – 3410.15

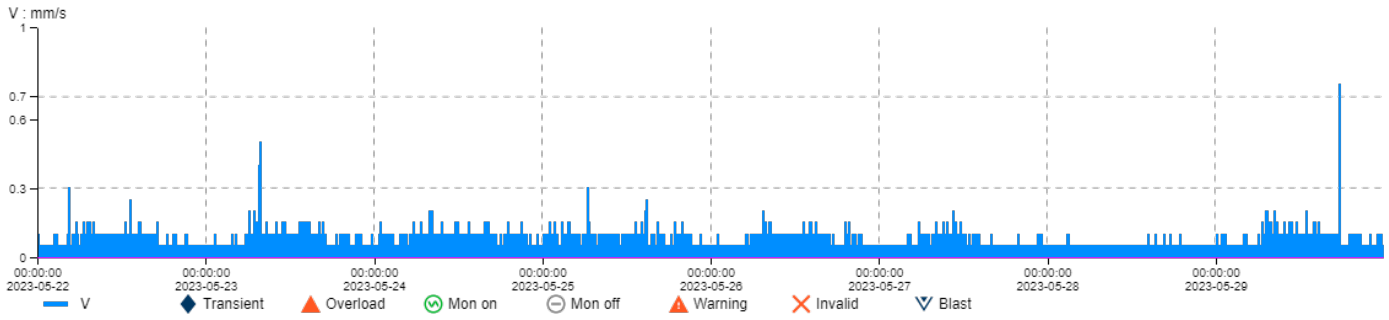
Multi report

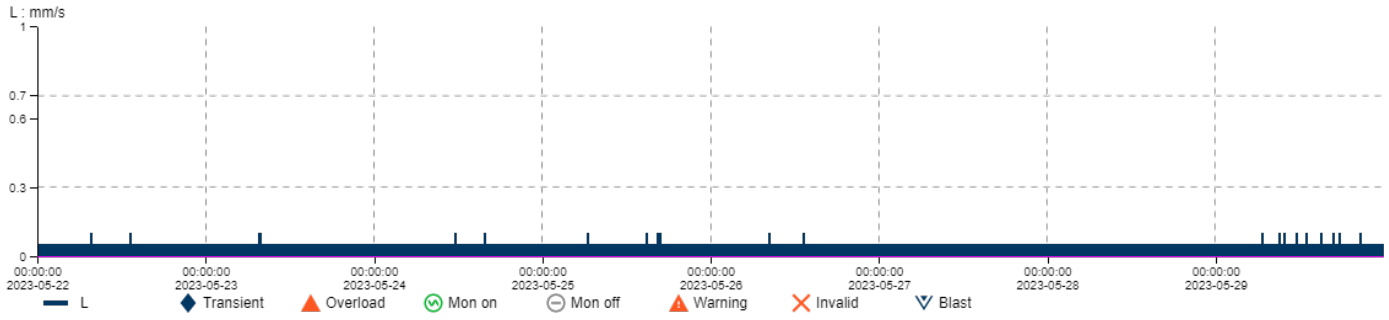
Project	TBY
Project maintainer	-
Time frame	2023-05-22 00:00 - 2023-05-29 23:59 (Australia/Sydney)

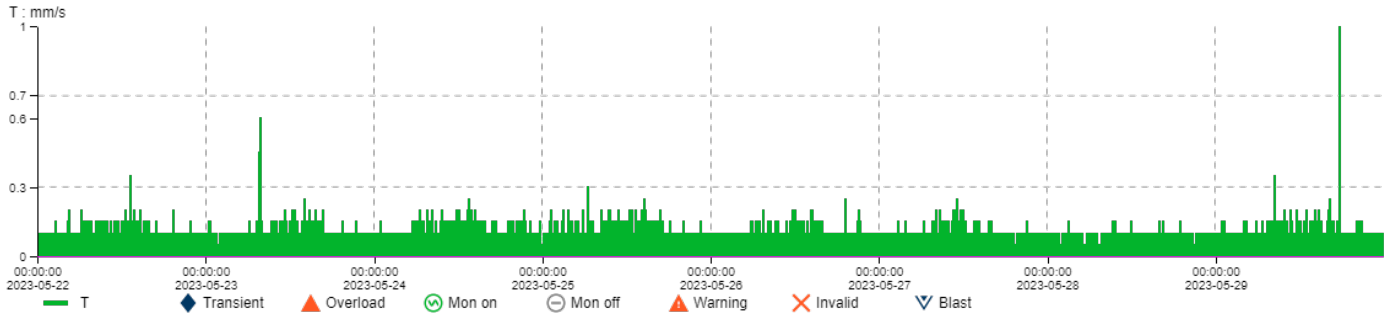
NB!

Chart data is aggregated by 4 minutes.

WBPS_1, East Boundary, C22, S/N: 106849, Calibrated: 2023-03-31, (18A) DIN4150-3 Anlage 250mm/s 1-315Hz

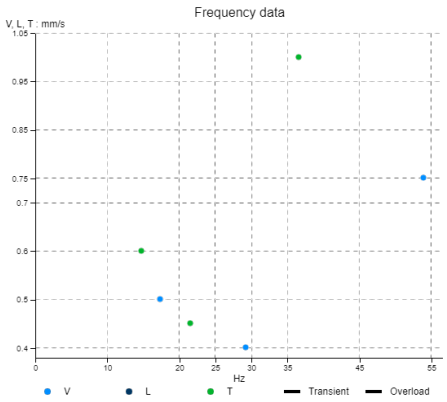






X-span	2023-05-22 00:00 - 2023-05-29 23:59
Y-span	V, L, T : mm/s: 0 - 1

	V	L	T
Max	0.75 mm/s	0.1 mm/s	1 mm/s
Date	2023-05-29	2023-05-22	2023-05-29
Time	17:36:00	07:44:00	17:36:00
Hz	53.9		36.6



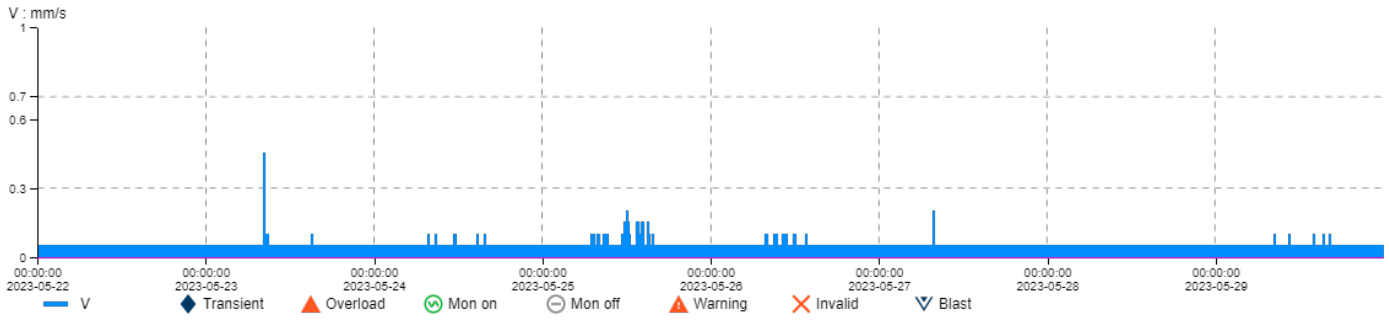
Multi report

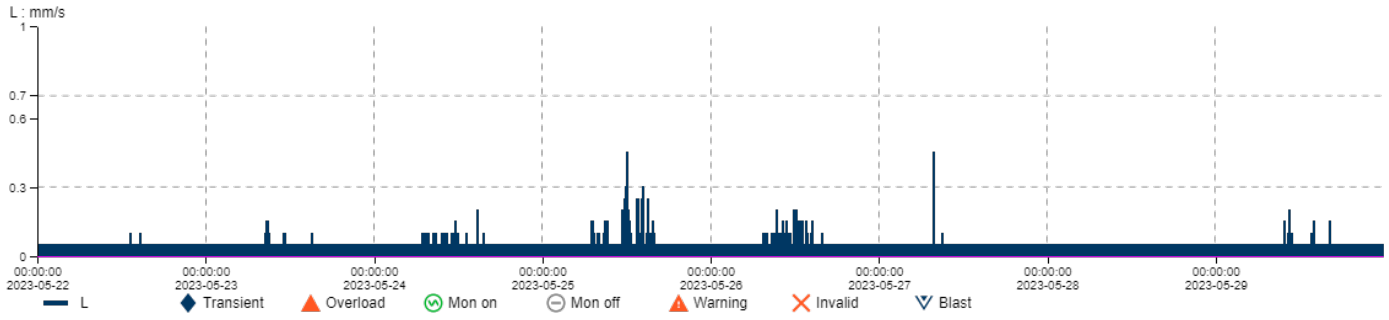
Project	TBY
Project maintainer	-
Time frame	2023-05-22 00:00 - 2023-05-29 23:59 (Australia/Sydney)

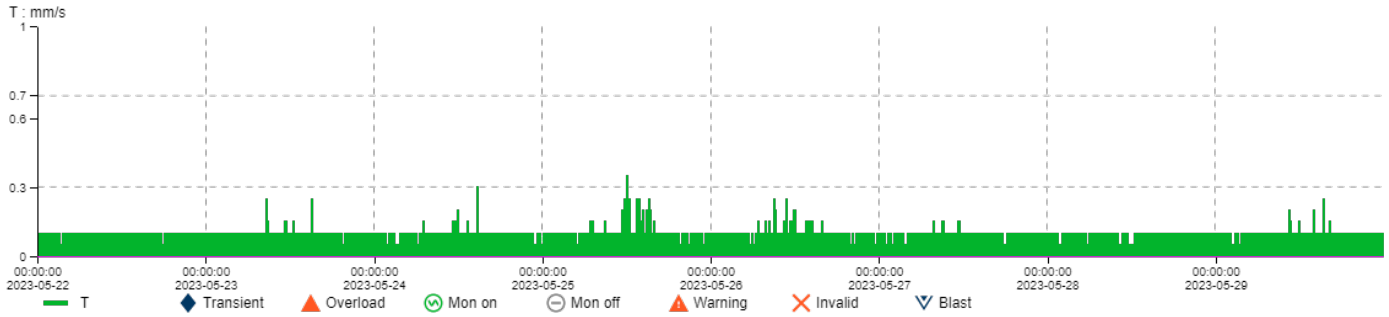
NB!

Chart data is aggregated by 4 minutes.

WBPS_2, Ground Floor, C22, S/N: 107775, Calibrated: 2023-04-01, (18A) DIN4150-3 Anlage 250mm/s 1-315Hz

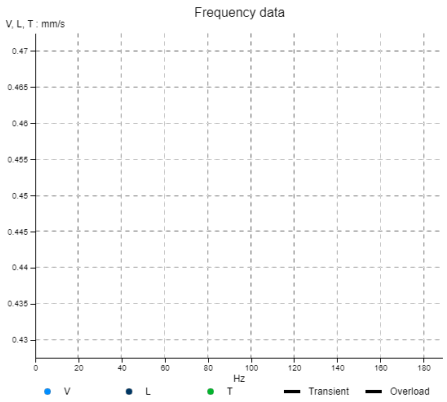






X-span	2023-05-22 00:00 - 2023-05-29 23:59
Y-span	V, L, T : mm/s: 0 - 1

	V	L	T
Max	0.45 mm/s	0.45 mm/s	0.35 mm/s
Date	2023-05-23	2023-05-25	2023-05-25
Time	08:20:00	12:00:00	12:00:00
Hz	512	293	



Multi report

Project	TBY
Project maintainer	-
Time frame	2023-05-22 00:00 - 2023-05-29 23:59 (Australia/Sydney)

NB!

Chart data is aggregated by 4 minutes.

WBPS_3, Upper Floor, C22, S/N: 107769, Calibrated: 2023-03-31, (18A) DIN4150-3 Anlage 250mm/s 1-315Hz

X-span	2023-05-22 00:00 - 2023-05-29 23:59
Y-span	V, L, T : mm/s: 0 - 1

	V	L	T
Max	0.4 mm/s	0.45 mm/s	0.75 mm/s
Date	2023-05-22	2023-05-25	2023-05-26
Time	17:00:00	07:44:00	12:24:00
Hz	14.4	81.9	1.8

AFJV Central Tunnel Package

Vibration Monitoring Event Report

Monitoring Information			
Test Location	White Bay Power Station, eastern boundary WBPS_1, WBPS_2 & WBPS_3	Unsound heritage structure	
Works Monitoring	TBM	Distance between geophone and works	~40 (underground)
Conducted by	[redacted]	Attended monitoring	No
Date	29/05-05/06/2023		

Instrumentation & Test Procedure			
Instrument	Sigicom C22		
Calibrator	Sigicom		
Calibration Date	31/3/23	Calibration Due	31/3/25
Monitor Serial #	107769, 107775 & 106849		

Preferred Criteria (circle criteria relevant to monitoring event)

	Reinforced or framed structures	Unreinforced or light framed structures	Heritage structurally sound	Heritage structurally unsound	Residential human comfort Day	Residential human comfort Night
Peak Particle Velocity (PPV mm/s)	25	7.5	7.5	2.5	-	-
Vibration Dose Value (VDV $mm/s^{1.75}$)	-	-	-	-	200	130

Monitoring Results

Start Time	00:00	Duration	8 days	
Trigger value (mm/s)	2.5	# of vibration triggers	0	

	Trans		Vert		Long	
	Value	Freq (Hz)	Value	Freq (Hz)	Value	Freq (Hz)
Peak Particle Velocity (PPV mm/s)	1.1	171	2.2	205	0.9	11.4
Vibration Dose Value (VDV $mm/s^{1.75}$)	-	-	-	-	-	

AFJV Central Tunnel Package

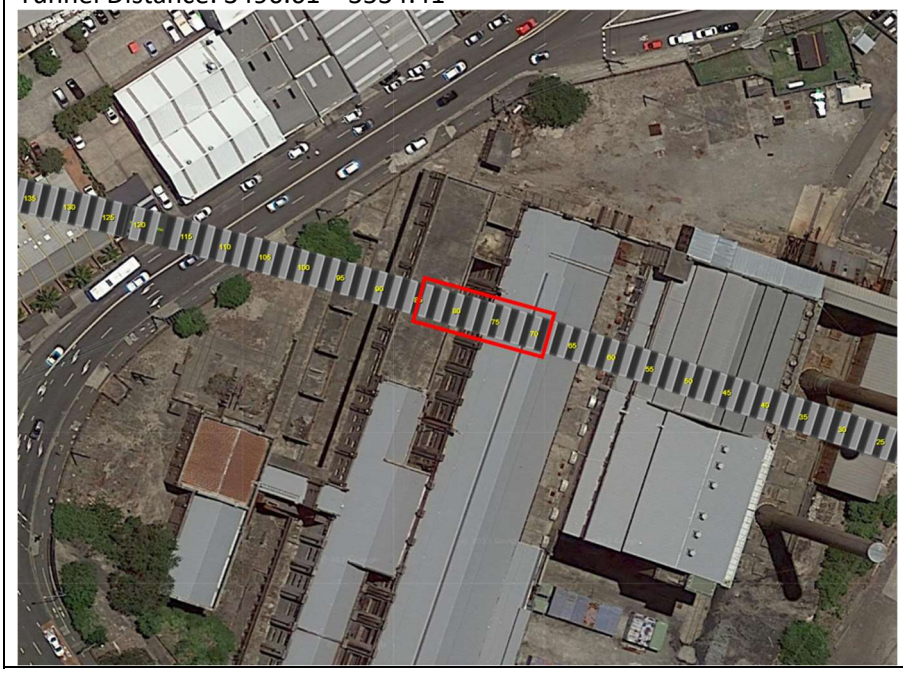
Below preferred criteria?	Yes

Notes and Diagram/Map

Below criteria.
PPV has frequency outside typical range for TBM and is likely to be from a non-CTP source
PPV occurred at 1:32pm on 30/5/23 at WBPS_3

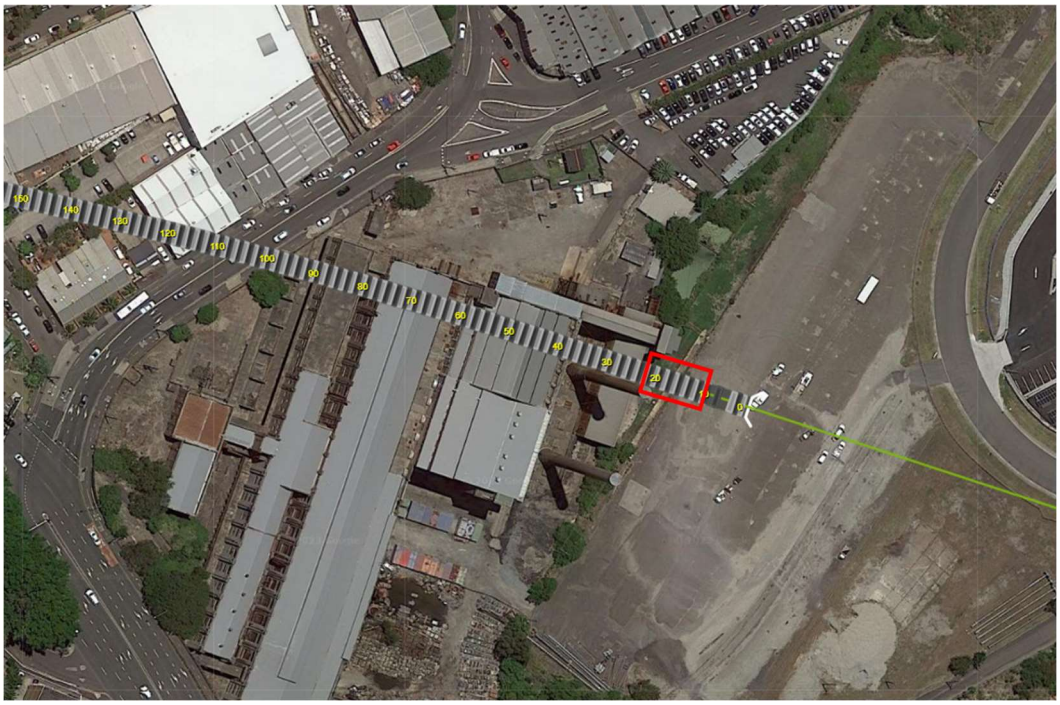
Location of monitors:

TBM4: 29/5/23 till 06/05/23 - Location during that week
Tunnel Distance: 3496.61 – 3534.41



AFJV Central Tunnel Package

TBM3:
29/5/23 till 06/05/23 - Location during that week
Tunnel distance: 3415.100 – 3428.390



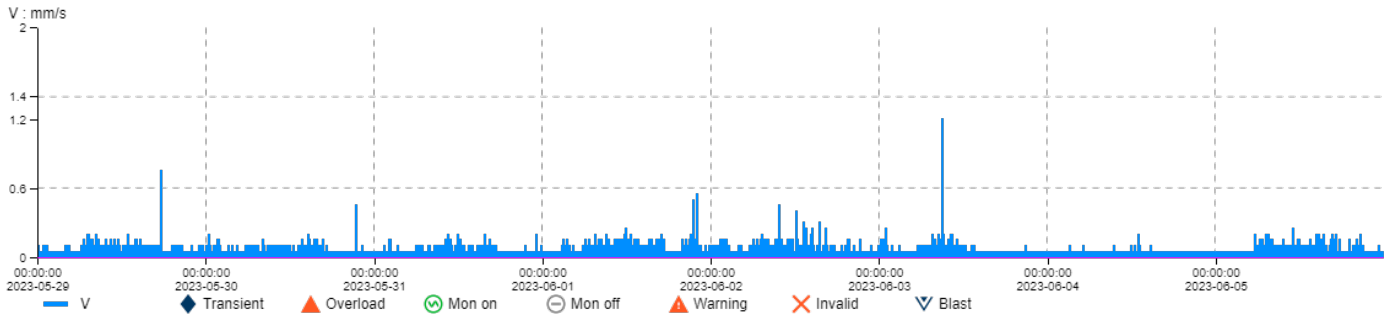
Multi report

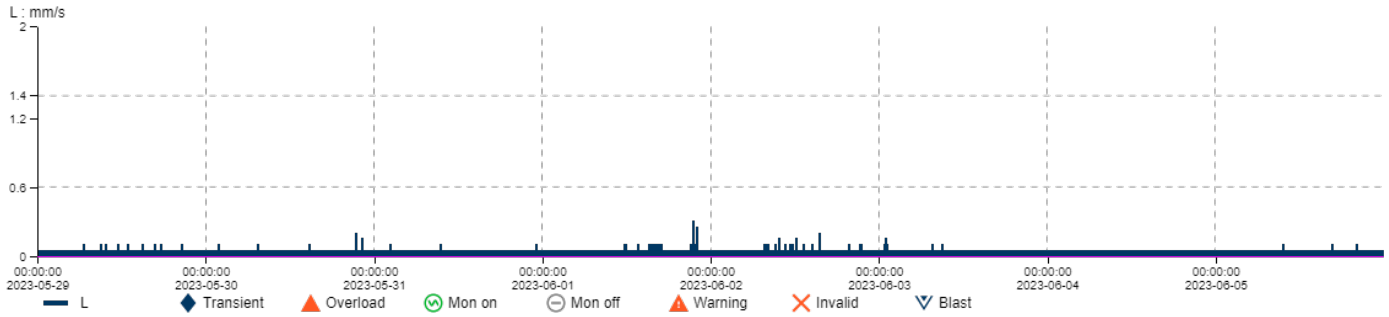
Project	TBY
Project maintainer	-
Time frame	2023-05-29 00:00 - 2023-06-05 23:59 (Australia/Sydney)

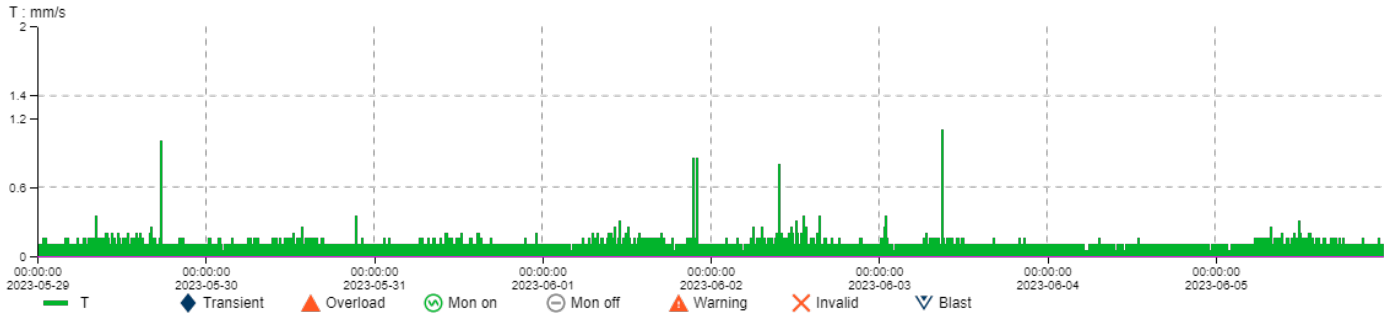
NB!

Chart data is aggregated by 4 minutes.

WBPS_1, East Boundary, C22, Serial number: 106849, Calibrated: 2023-03-31,



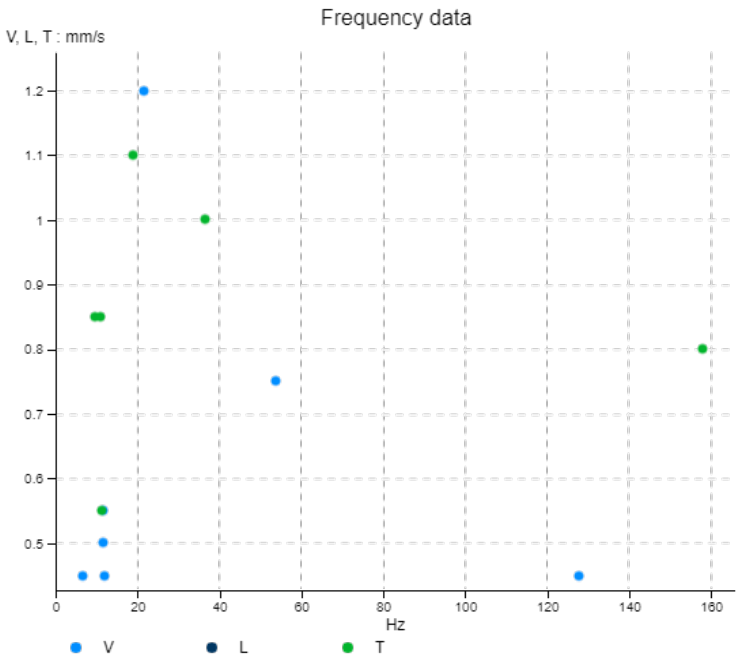




X-span	2023-05-29 00:00 - 2023-06-05 23:59
Y-span	V, L, T : mm/s: 0 - 2

	V	L	T
Max	1.2 mm/s	0.3 mm/s	1.1 mm/s
Date	2023-06-03	2023-06-01	2023-06-03
Time	09:00:00	21:28:00	09:00:00
Hz	21.8		19.1

Multi report



Multi report

Project	TBY
Project maintainer	-
Time frame	2023-05-29 00:00 - 2023-06-05 23:59 (Australia/Sydney)

NB!

Chart data is aggregated by 4 minutes.

WBPS_2, Ground Floor, C22, Serial number: 107775, Calibrated: 2023-04-01,

X-span	2023-05-29 00:00 - 2023-06-05 23:59
Y-span	V, L, T : mm/s: 0 - 1

	V	L	T
Max	0.4 mm/s	0.65 mm/s	0.95 mm/s
Date	2023-06-02	2023-06-02	2023-06-02
Time	09:56:00	09:56:00	09:56:00
Hz		256	205

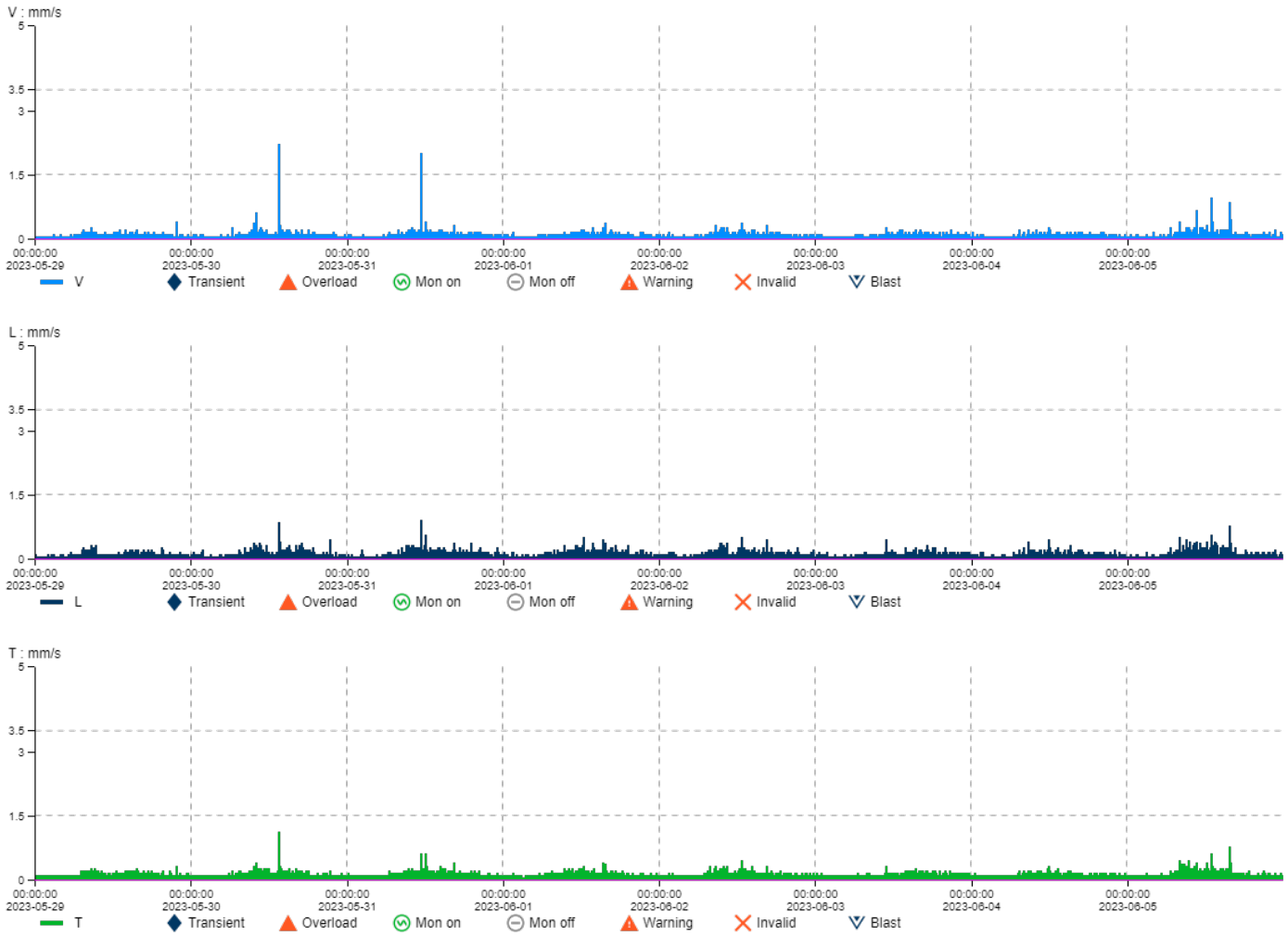
Multi report

Project	TBY
Project maintainer	-
Time frame	2023-05-29 00:00 - 2023-06-05 23:59 (Australia/Sydney)

NB!

Chart data is aggregated by 4 minutes.

WBPS_3, Upper Floor, C22, Serial number: 107769, Calibrated: 2023-03-31,



X-span	2023-05-29 00:00 - 2023-06-05 23:59
Y-span	V, L, T : mm/s: 0 - 5

	V	L	T
Max	2.2 mm/s	0.9 mm/s	1.1 mm/s
Date	2023-05-30	2023-05-31	2023-05-30
Time	13:32:00	11:24:00	13:32:00
Hz	205	11.4	171

APPENDIX C - SURFACE WATER MONITORING

Surface Water Monitoring- December 2022- June 2023

TABLE 6-4 PELIMINARY TRIGGER VALUES TO MAINTAIN WATER QUALITY OBJECTIVES

Receiving water/coarse type (WQO)	Turbidity	pH	Dissolved Oxygen	Oil and grease	Electrical conductivity/Salinity
Aquatic Ecosystem (Estuaries)	0.5–10 NTU	7.0-8.5	80-110%	None visible on surface	Lowland rivers: 125–2200 µS/cm

ANZECC (2000) - slightly to moderately disturbed aquatic ecosystem exceedance

Pre existing condition exceedances

SW Monitoring ID	Waterway Name	Coordinates	Date	Person (Undertaking Measurements)	Sample Time	Monitoring Category	pH	Temp (degrees)	DO (mg/L)	DO (%)	Electrical Conductivity (mS/cm)	Electrical Conductivity (uS/cm)	Turbidity (NTU)	Visual Inspection (Oil & Grease)	Current Weather Conditions	Rainfall in last 24hrs Sydney (Observatory Hill) (mm)	Rainfall in last 24hrs ydney Olympic Park AWS (Archery Centre) (mm)	Additional Comments	Brand of Instrument	Model of Instrument	Serial No	Calibration Certification
WB-D/S	White Bay	-33.866245° S, 151.180450° E	20/01/2023	[redacted]	3:48 PM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Drizzle	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	20/01/2023		3:25 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.7	23.03	7.03	91	29.1	29100	92.4	None	Drizzle	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	20/01/2023		3:17 PM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Drizzle	5.8	0.4	Dried	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	20/01/2023		3:11 PM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Drizzle	5.8	0.4	Dried	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	20/01/2023		2:42 PM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Drizzle	5.8	0.4	Dried	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	20/01/2023		2:32 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7	23.58	8.98	106.7	2.46	2460	104	Water body was dried with very pungent smell	Drizzle	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	20/01/2023		2:27 PM	Monthly Monitoring/ Post-Rainfall Monitoring	9.15	23.31	15.36	181.8	2.13	2130	70	Water body was dried with very pungent smell	Drizzle	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	20/01/2023		2:55 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.41	23.86	4.69	63.1	35	35000	42	None	Drizzle	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/s	White Bay	-33.866245° S, 151.180450° E	21/02/2023		10:18 AM	Monthly Monitoring/ Post-Rainfall Monitoring	8.12	21.33	12.08	110	41	41000	8	None	Sunny	0	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	21/02/2023		11:13 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.47	22.3	13.41	137.4	9.03	9030	59.2	None	Sunny	0	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	21/02/2023		11:20 AM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Sunny	0	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	21/02/2023		11:34 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.4	23.4	10.34	111.4	2.29	2290	179	None	Sunny	0	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	21/02/2023		11:47 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.45	23.1	11.26	126.6	0.37	370	59.5	None	Sunny	0	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	21/02/2023		11:58 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.31	23.6	8.98	106.7	2.46	2460	86	None	Sunny	0	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	21/02/2023		12:02 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.56	22.1	10.08	100.2	0.264	264	42	None	Sunny	0	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	21/02/2023		12:18 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.45	14.97	12.82	127.4	1.03	1030	39.6	None	Sunny	0	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/s	White Bay	-33.866245° S, 151.180450° E	30/03/2023		7:23 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.11	20.71	8.9	118.1	46	46000	24.2	None	Sunny	4.2	6		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	30/03/2023		12:04 PM	Monthly Monitoring/ Post-Rainfall Monitoring	8.01	19.79	10.03	125.1	35.1	35100	33.7	None	Sunny	4.2	6		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	30/03/2023			Monthly Monitoring/ Post-Rainfall Monitoring									Sunny	4.2	6		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	30/03/2023		9:39 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.62	19.75	10.26	129.7	38.4	38400	31.6	None	Sunny	4.2	6		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	30/03/2023		9:11 AM	Monthly Monitoring/ Post-Rainfall Monitoring	8.37	17.75	18.03	190.3	1.44	1440	35.6	None	Sunny	4.2	6	Low flow, Less water, area maybe affected by sewage overflow as per Sydnye Water	Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	30/03/2023		8:48 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.84	17.47	8.32	91.5	14.9	14900	31.2	None	Sunny	4.2	6		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	30/03/2023		8:44 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.73	19.23	7.05	81.8	19.3	19300	35.7	None	Sunny	4.2	6		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM

HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	30/03/2023	[redacted]	8:11 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.52	20.6	6.78	86.9	38	38000	34.9	None	Sunny	4.2	6		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/s	White Bay	-33.866245° S, 151.180450° E	28/04/023		3:22 PM	Monthly Monitoring	7.89	22.55	16.02	230.2	50.2	50200	0.8	None	Sunny	0	0	High tide	Horriba	U-52	30364DB5	
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	27/04/2023		4:00 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.85	22.29	6.1	80	49.6	49600	9	None	Sunny	0	0		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	27/04/2023		4:10 PM	Monthly Monitoring/ Post-Rainfall Monitoring	8.06	23.44	11.2	122.5	0.731	731	35.8	None	Sunny	0	0		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	27/04/2023		4:20 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.51	23.19	9.04	103.4	25.4	25400	22.5	None	Sunny	0	0		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	27/04/2023		4:35: PM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Sunny	0	0		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	27/04/2023		4:50 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.45	22.52	7.42	89.1	7.22	7220	40	None	Sunny	0	0		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	27/04/2023		5:00 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.55	22.4	81.5	35.2	9.44	9440	13.5	None	Sunny	0	0		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	27/04/2023		5:20 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.6	21.83	7.2	95.2	36.3	36300	11.5	None	Sunny	0	0		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/s	White Bay	-33.866245° S, 151.180450° E	31/05/2023		1:00PM	Monthly Monitoring										0	0	Couldn't collect sample due to low tide and water level was really low.	U-52	30364DB5	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	31/05/2023		10:52 AM	Monthly Monitoring/ Post-Rainfall Monitoring	8	16.32	13.1	152.1	34	34000	14	None	Sunny	0	0		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	31/05/2023		10:54am	Monthly Monitoring/ Post-Rainfall Monitoring										0	0		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	31/05/2023		11:20 AM	Monthly Monitoring/ Post-Rainfall Monitoring	8.23	15.6	7.4	89.3	46.8	46800	13	None	Sunny	0	0		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	31/05/2023		11:35 AM	Monthly Monitoring/ Post-Rainfall Monitoring										0	0		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	31/05/2023		12:00PM	Monthly Monitoring/ Post-Rainfall Monitoring	8.26	16.15	10.94	134.3	48.1	48100	1.3	None	Sunny	0	0		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	31/05/2023		12:15 PM	Monthly Monitoring/ Post-Rainfall Monitoring	8.27	15.84	9.05	106.1	38.8	38800	47.4	None	Sunny	0	0		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	31/05/2023		12:21 PM	Monthly Monitoring/ Post-Rainfall Monitoring	8.24	18.37	9.04	113.3	43	43000	10.2	None		0	0		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/s	White Bay	-33.866245° S, 151.180450° E	20/06/2023		3:48 PM	Monthly Monitoring	8	21.33	6.98	95.2	42.9	42900	5.5	None	Sunny	0.2	0.2		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	20/06/2023		3:25 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.47	15.25	13.41	137.4	9.03	9030	59.2	None	Sunny	0.2	0.2		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	20/06/2023		3:17 PM	Monthly Monitoring/ Post-Rainfall Monitoring	9.03	22.69	10.75	124.9	0.731	731	39.8	None	Sunny	0.2	0.2		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	20/06/2023		3:11 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.66	23.17	8.25	105.4	25.4	25400	25.3	None	Sunny	0.2	0.2		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	20/06/2023		2:42 PM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Sunny	0.2	0.2		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	20/06/2023		2:32 PM	Monthly Monitoring/ Post-Rainfall Monitoring	8.66	18.86	15.78	172.4	5.18	5180	57.3	None	Sunny	0.2	0.2		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	20/06/2023		2:27 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.45	22.43	83.32	39.5	9.44	9440	15.5	None	Sunny	0.2	0.2		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	20/06/2023		2:55 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.41	20.65	5.91	78.5	46.5	46500	7.3	None	Sunny	0.2	0.2		U-52	NU90SAUM	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM

APPENDIX D - GROUNDWATER MONITORING

Monitoring Methodology

7.1 OVERVIEW

The methodology for monitoring groundwater for the project includes:

- Assessment of groundwater level (measurement and datalogger download)
- Assessment of groundwater salinity as EC (datalogger download)
- Assessment of groundwater quality at key locations
- Assessment of WTP discharge water quality (grab samples for lab analysis and field measurements)
- Assessment of groundwater inflows (pump flow meter data)
- Implementation of quality control plan including appropriate chain-of-custody for laboratory analysis and provision of appropriate documentation.

Groundwater monitoring is to be undertaken by suitably qualified personnel at all times.

Groundwater monitoring will be undertaken in accordance with the following monitoring regime:

- Baseline monitoring will be gathered from all bores for at least two consecutive months prior to construction commencing that will interact with groundwater
- Construction monitoring will occur monthly for the first three months of construction and then quarterly thereafter
- Construction monitoring will occur at smaller intervals where the Revised Groundwater Modelling Report indicates it is required
- Continuous groundwater level and EC monitoring will only occur where recommended by the Revised Groundwater Modelling Report
- WTP discharge monitoring is outlines in Section 7.5
- Groundwater inflow monitoring is outlined in Section 7.6.

7.2 MANUAL GROUNDWATER LEVEL MEASUREMENTS

Groundwater monitoring will be overseen by personnel with appropriate qualifications and experience. Trained field personnel will complete monitoring rounds using appropriate personal protective equipment (PPE) and monitoring equipment.

The static groundwater level will be measured and recorded at each standpipe groundwater monitoring bore using an electronic groundwater level dip meter (dipper) to verify the continuous data recorded by dataloggers. The level (to the nearest millimetre) will be referenced to a known (and consistent) surveyed point at the top of the bore casing (mTOC). This measurement will be corrected to mAHD using survey data. Recorded groundwater level will be tabulated in both metres below top of bore casing (mBTOC) and mAHD.

The base of the bore will be measured and recorded periodically by lowering the dipper to the base of the bore until it touches the bottom, where possible.

7.3 CONTINUOUS GROUNDWATER LEVEL AND QUALITY (EC) MEASUREMENTS

Groundwater level (as pressure) and EC will be measured automatically by calibrated dataloggers at key monitoring locations and VWPs (pore pressure only). Continuous data (recorded every 6 hours) will be periodically validated by manual measurements. Continuous groundwater level and EC monitoring will only occur in those bores where recommended in the Revised Groundwater Modelling Report, otherwise they will be monitored quarterly.

Groundwater level/pressure measurement will be converted to mAHD using calibration coefficients, installation data, and survey data. Spreadsheets will be maintained detailing the conversion and converted groundwater level measurement.

The dataloggers will be downloaded quarterly. Dataloggers will be checked and maintained as necessary before being re-calibrated and then returned to the monitoring bore at a known depth below the top of casing.

7.4 MANUAL GROUNDWATER QUALITY SAMPLING

Groundwater quality sampling will be carried out by suitably qualified personnel at all times, in accordance with AS/NZS 5667.11:1998, and will follow these general principles:

- Sampling equipment should not change the water quality in any way; particular effort should be made to avoid cross contamination between bores and sampling equipment
- Sufficient water should be removed to ensure the sample is newly derived from the aquifer itself rather than from water that sits in the bore
- Methods of collection and storage in bottles and transportation to the laboratory should suit the type of analysis required.

Groundwater sampling may produce a potentially large volume of purged water. This water will be captured in containers and treated in the constructions WTP's or disposed of in accordance with the Waste Management Plan. To avoid large volumes of purged water, low-flow monitoring is recommended where possible. Passive sampling or no-purge sampling may be suitable in some of the monitoring bores, however, these sampling methods will only be carried out where recommended by the subject matter expert.

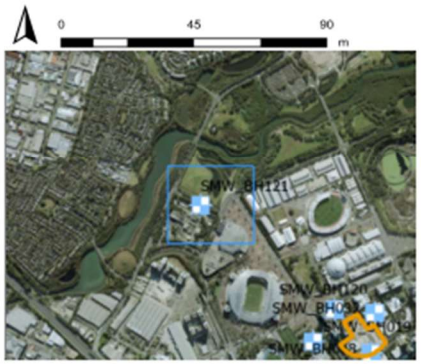
Sydney Metro West - CTP

Tunnel North West of SOP

Legend

Site boundary

Groundwater well



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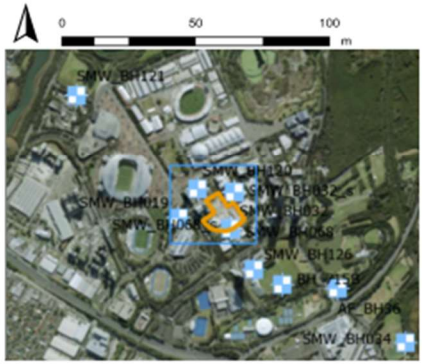
Sydney Metro West - CTP

Sydney Olympic Park

Legend

- Site boundary
- Groundwater well



This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

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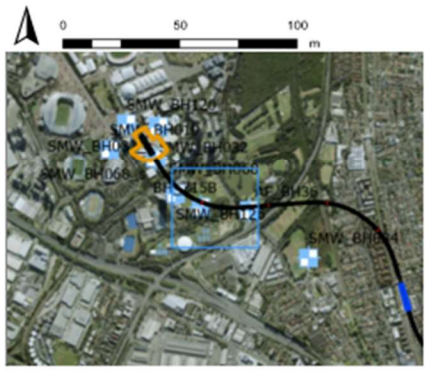
Sydney Metro West - CTP

Tunnel - Sydney Olympic Park to Nort...

Legend

- Site boundary
- Groundwater well



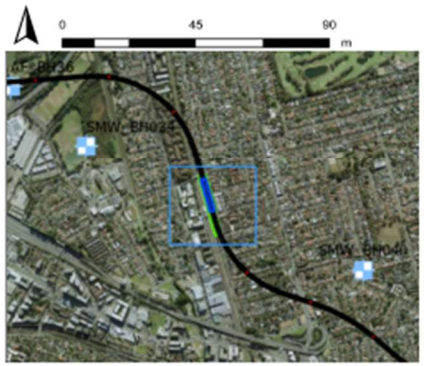
Sydney Metro West - CTP

North Strathfield

Legend

Site boundary

Groundwater well



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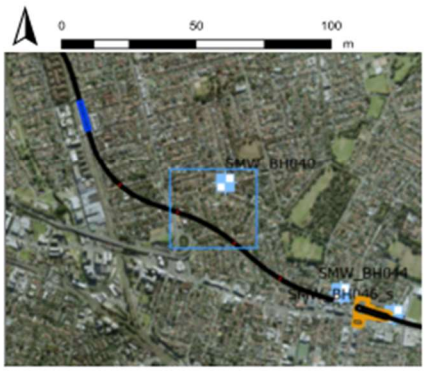
Sydney Metro West - CTP

Tunnel - NST to BWD

Legend

Site boundary

Groundwater well



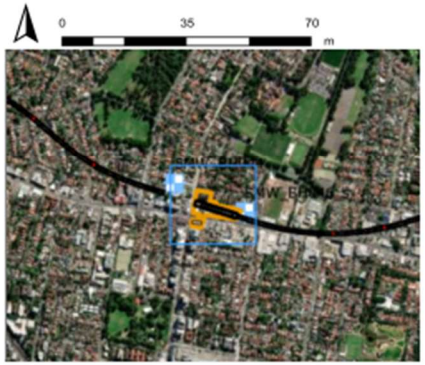
Sydney Metro West - CTP

Burwood North

Legend

Site boundary

Groundwater well



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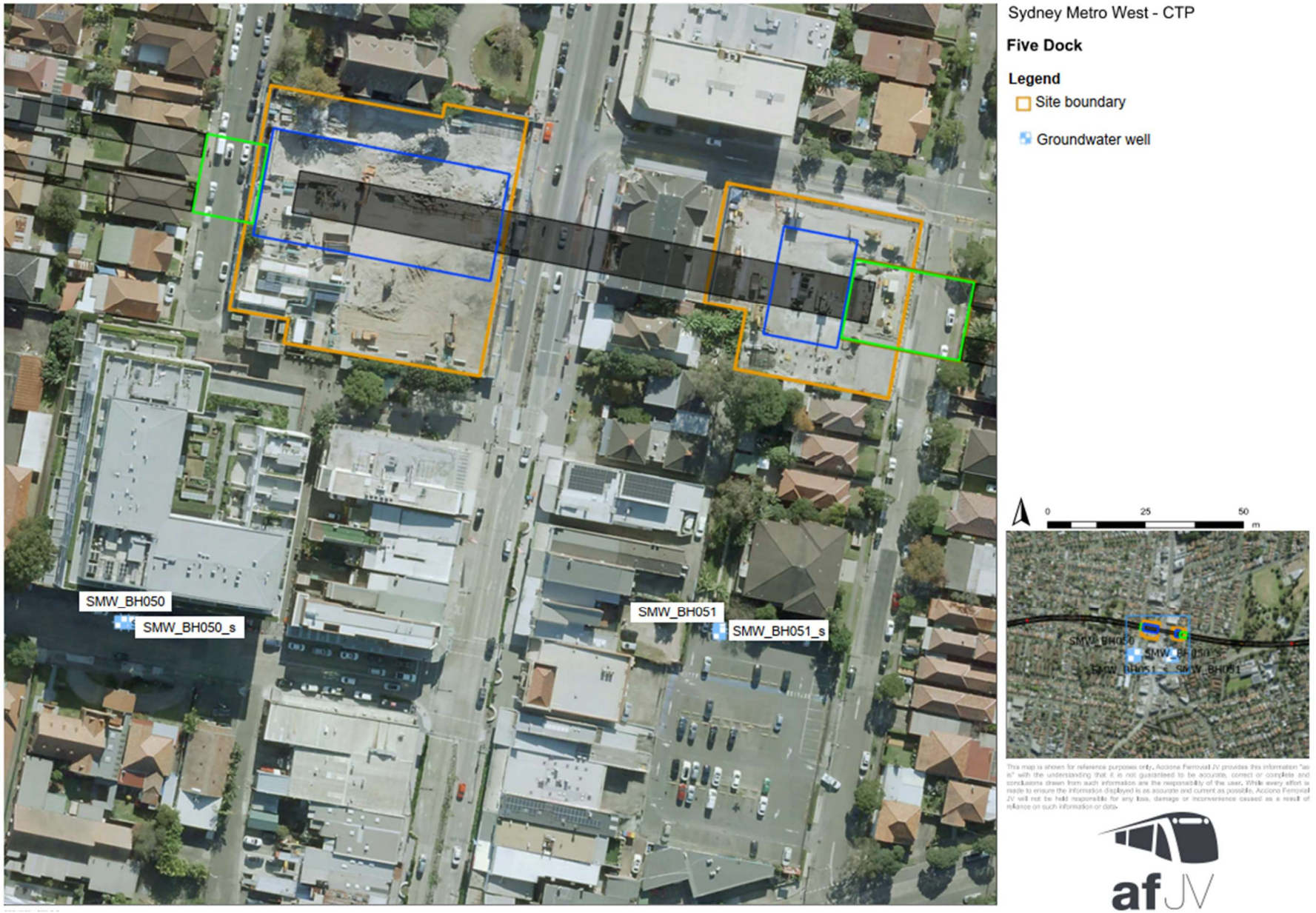


Sydney Metro West - CTP

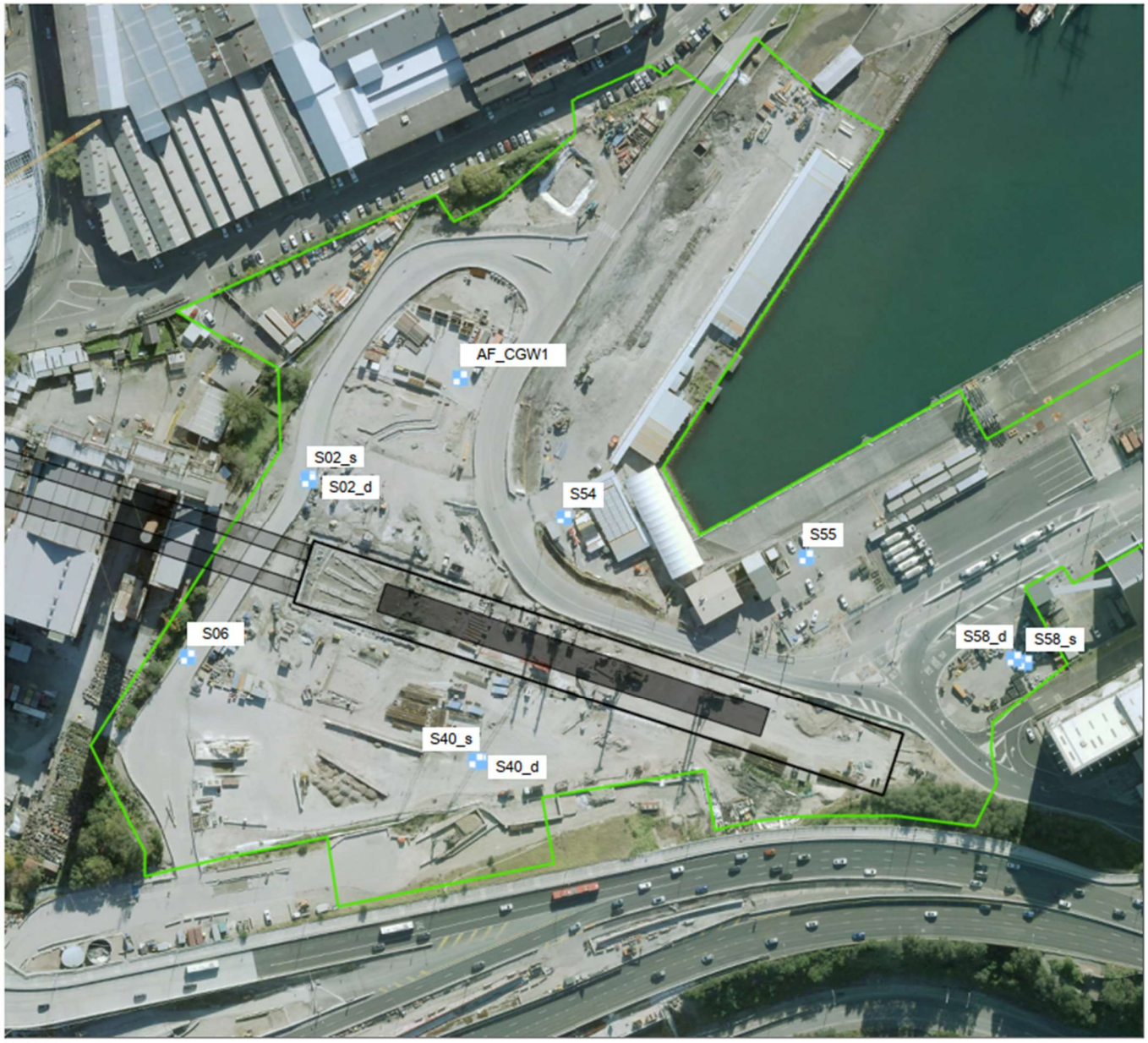
Five Dock

Legend

Site boundary

Groundwater well

afJV



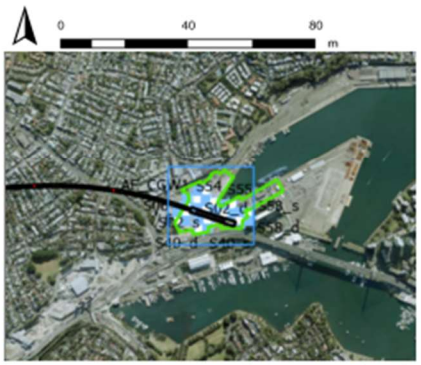
Sydney Metro West - CTP

The Bays

Legend

Site boundary

Groundwater well



afJV

Table 6-3 AFJV GROUNDWATER BORE LOCATION AND MONITORING DETAILS

Location	Bore ID	Depth classification	Ground surface elevation (mAHD)	Screened interval (m)	Screened aquifer	Monitoring*	Comments
Tunnel – NW of SOP	SMW_BH070	Deep Rock	4.85	27.7 - 30.7	Siltstone/ sandstone	WQ/EC/L	
	SMW_BH121	Deep Rock	4.15	13 - 16	Siltstone	WQ/EC/L	
Sydney Olympic Park	SMW_BH120	Deep Rock	17.38	22.5 - 25.5	Siltstone/ sandstone	WQ/EC/L	
	SMW_BH019	Deep Rock	17.33	22.5 - 25.5	Siltstone	WQ/EC/L	
	SMW_BH015	Deep Rock	22.94	25.2 - 28.2	Siltstone	Nil	Has been destroyed
	SMW_BH015_s	Shallow Rock	22.02	1.5 - 4.5	Siltstone/ sandstone	Nil	Has been destroyed.
	SMW_BH032	Deep Rock	19.74	18 - 22	Siltstone	EC/L	WQ will be sampled in pre-construction baseline sampling.
	SMW_BH032_s	Shallow Rock	19.76	3.5 – 7.25	Siltstone	EC/L	Likely to be dry and unable to be sampled.
	SMW_BH068	Deep Rock	23.64	22.2 – 25.1	Siltstone/ sandstone	WQ/EC/L	Known well obstruction and may not be able to be sampled. This well will be reassessed during the pre-
							construction baseline sampling.
	SMW_BH068_s	Shallow Rock	23.36	2.6 – 4.3	Siltstone/ sandstone	WQ/EC/L	Likely to be dry and unable to be sampled.
	SMW_BH126	Deep Rock	11.4	9.2 -12.2	Fill/ Siltstone	WQ/EC/L	
Tunnel – SOP to NS	SMW_BH069	Deep Rock	7.96	19.4 – 22.4	Unknown	WQ/EC/L	
	SMW_BH033	Deep Rock	6.82	8.5 – 11.5	Siltstone	WQ/EC/L	
	SMW_BH034	Deep Rock	2.44	26.2 – 29.2	Sandstone	WQ/EC/L	
North Strathfield	SMW_BH038	Deep Rock	9.91	26.0 – 32.0	Siltstone/ sandstone	WQ/L	
	SMW_BH009	Deep Rock	18.45	37.45 – 40.45	Sandstone	L	
	SMW_BH009_s	Shallow Rock	18.6	1.0 – 5.0	Gravelly clay/ siltstone	L	
	SMW_BH073	Shallow Rock	18.93	10.2 – 13.2	Siltstone	Nil	To be destroyed during construction – No monitoring proposed.
	SMW_BH035	Deep Rock	26.74	33.5 – 45.5	Siltstone/ sandstone	WQ/EC/L	
	SMW_BH035_s	Shallow Rock	26.62	1.7 – 3.2	Siltstone	WQ/EC/L	
Tunnel – NS to B	SMW_BH040	Deep Rock	23.06	45.0 – 54.0	Sandstone	EC/L	

Location	Bore ID	Depth classification	Ground surface elevation (mAHD)	Screened interval (m)	Screened aquifer	Monitoring*	Comments
Burwood	SMW_BH044	Deep Rock	22.6	22.5 – 34.5	Siltstone/ sandstone	WQ/EC/L	
	SMW_BH046	Deep Rock	6.47	6.0 – 15.0	Siltstone/ sandstone	WQ/EC/L	Has been destroyed due to Concord Oval works, to be replaced.
	SMW_BH046_s	Shallow Sediments	6.47	1.3 – 3.1	Clay	WQ/EC/L	Likely to be dry and unable to be sampled.
Five Dock	SMW_BH050	Deep Rock	24.34	9.0 – 24.5	Siltstone/ sandstone	WQ/EC/L	
	SMW_BH050_s	Shallow Sediments	24.35	0.4 – 1.3	Gravelly clay	WQ/EC/L	Likely to be dry and unable to be sampled.
	SMW_BH082	Deep Rock	18.04	9.3 – 12.4	Siltstone/ sandstone	Nil	Has been destroyed during construction.
	SMW_BH051	Deep Rock	21.68	7.0 – 10.0	Siltstone/ sandstone	WQ/EC/L	
	SMW_BH051_s	Shallow Sediments	21.66	0.8 – 2.0	Silty clay	WQ/EC/L	Likely to be dry and unable to be sampled.
The Bays	SMW_ENV020	Deep Sediments	2.94	9.0 – 15.0	Sand/ Sandy clay/ Sand/ Silt	Nil	Has been destroyed during construction.

Location	Bore ID	Depth classification	Ground surface elevation (mAHD)	Screened interval (m)	Screened aquifer	Monitoring*	Comments
	SMW_ENV020_s	Shallow Sediments	2.94	2.5 – 5.5	Sand/ Silt/ Silty sand	Nil	Has been destroyed during construction.
	SMW_ENV021	Deep Sediments	3.09	9.4 – 14.4	Core loss/ Sand	WQ/EC/L	Has been damaged due to pre-excavation grouting.
	SMW_ENV021_s	Shallow Sediments	3.09	2.2 – 4.6	Silty sand/ Sand	WQ/EC/L	Has been damaged due to pre-excavation grouting.
	SMW_ENV026	Shallow Sediments	4.23	3.5 – 6.5	Sand/ Silty sand	Nil	Has been destroyed during construction.
	SMW_ENV027	Shallow Sediments	3.58	2.0 – 5.0	Fill/ Sand/ Clay	Nil	Has been destroyed during construction.
	SMW_BH066	Deep Rock	4.14	27.2 – 30.2	Sandstone	Nil	Has been destroyed during construction.
	SMW_BH066_s	Shallow Sediments	4.14	2.0 – 6.0	Fill/ Sand/ Silty sand	Nil	Has been destroyed during construction.
	SMW_ENV034	Deep Sediments	3.17	7.9 – 9.3	Sand/Sandy clay/ Clayey sand	Nil	Has been destroyed during construction.

Location	Bore ID	Depth classification	Ground surface elevation (mAHD)	Screened interval (m)	Screened aquifer	Monitoring*	Comments
	SMW_BH067	Deep Rock	2.93	12.5 – 15.5	Sandstone	Nil	Has been destroyed during construction.
	SMW_BH067_s	Shallow Rock	2.92	2.5 – 6.0	Sandstone	Nil	Has been destroyed during construction.
	S02_s	Shallow sediment	3.11	0.7 – 6		WQ/EC/L	
	S02_d	Deep Rock	3.11	11 – 15.1	Fill/ Sand/ Silty sand	WQ/EC/L	
	S06	Deep Rock	3.13	13.5 – 20.44	Sandstone	WQ/EC/L	
	S40_s	Shallow sediments	3.60	0.5 – 8	Fill/ Sand/ Silty sand	WQ/EC/L	
	S40_d	Deep rock	3.68	8.7 – 15.2	Sandstone	WQ/EC/L	
	S51	Shallow sediments	4.15	0.8 – 6.2	Fill/ Sand/ Silty sand	WQ/EC/L	Has been destroyed due to construction.
	AF_CGW1	Shallow sediments	4.15	4.5-10	Alluvium	WQ/EC/L	Replacement for S51.
	S54	Deep rock	3.59	12 – 17.5	Sandstone	WQ/EC/L	
	S55	Shallow sediments	3.13	0.5 – 6.22	Fill/ Sand/ Silty sand	WQ/EC/L	
	S58_s	Shallow sediment	3.24	0.7 – 6	Fill/ Sand/ Silty sand	WQ/EC/L	

Location	Bore ID	Depth classification	Ground surface elevation (mAHD)	Screened interval (m)	Screened aquifer	Monitoring*	Comments
	S58_d	Deep rock	3.22	18 – 21.5	Sandstone	WQ/EC/L	

WQ = Water Quality Monitoring. EC = Electrical Conductivity Monitoring. L = Groundwater level monitoring
*Due to a number of monitoring bores being located within the extent of the station boxes or tunnel alignment, which will be destroyed during construction, these monitoring wells will not be monitored during construction. Monitoring may still occur at these locations prior to construction to assist in gathering baseline information.

Borehole details obtained during monitoring period

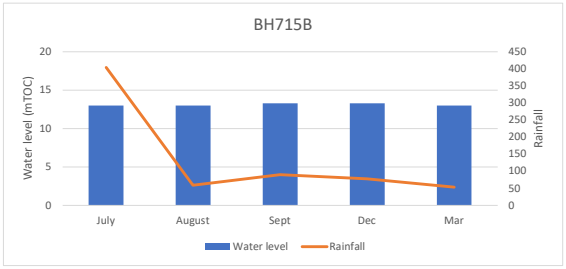
Month	Borehole Number	Temperature	Ph	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/l)	Redox (mV)	Water level (mTOC)	Water level (mAHD)	Sampled/ Gauged	Monitoring
	Deep/Shallow									
July	BH019						14.8	3.1211	gauged	WQ/EC/L
August		19.9	6.65	4600	5.48	-76.7	14.56	3.3611	sampled	
September							N/A	-	N/A	
December							N/A	-	N/A	
March							N/A		N/A	
July	BH120						17.65	0.2859	gauged	WQ/EC/L
August							17.64	0.2759	gauged	
September		20.9	4.11	13.5	229.2	117.2	17.66	0.2959	sampled	
December		20.2	6.58	17062	49.8	68.5	17.57	0.2059	sampled	
March		20.1	6.55	18126	47.6	100.1	18.3	0.9359	sampled	
July	BH068d, BH068s	17.2	7.16	1.09	7.25	114.4	8.35	15.3229	sampled,gauged	WQ/EC/L
August		21.9	7.58	2898	3.02	27.8	12.3	11.3729	sampled,gauged	
September		23.6	4.52	5.1	8.4	2.1	11.17	12.5029	sampled,gauged	
December		27.5	5.6	2776	24.6	623	8.86	14.8129	sampled,gauged	
March		28	6	2013	23.2	90	8.34	15.3329	sampled,gauged	
July	BH121						3.44	1.41	gauged	WQ/EC/L
August		17.5	9.04	44.38	51.3	-15.2	3.5	1.35	sampled	
September		20.6	6.54	47837	0.03	118.7	3.44	1.41	sampled	
December		23	6.66	1996	24.2	66.8	3.36	1.49	sampled	
March		23	7.7	3119	25.4	79.3	3.11	1.74	sampled	
July	BH715b						13.01	-	gauged	WQ/EC/L
August		20.5	6.25	21062	1.23	-118.2	13	-	sampled	
September		33.2	4.27	2100	5.48	164.2	13.3	-	sampled	
December		20.5	6.3	26940	12	80.6	13.3	-	sampled	
March		20.6	6.6	15000	23.2	90.1	13	-	sampled	
July	AF_BH36						5.01	22.029	sampled	WQ/EC/L
August							4.98	22.059	sampled	
September							4.77	22.269	gauged	
December							4.82	22.219	gauged	
March							4.56	22.479	gauged	
July	BH126						3.51	7.89	sampled	WQ/EC/L
August		20.4	7.93	16187	0.48	-67.5	3.57	7.83	sampled	
September							3.16	8.24	sampled	
December		20.1	7.63	14088	30.4	-26.1	4.89	6.51	sampled	
March		20	7.67	99946	40.1	-4.89	5	6.4	sampled	
July	BH032, BH032s						N/A	-	N/A	EC/L
August							6.15	13.59	gauged, gauged	
September							7.13	12.61	gauged, gauged	
December							N/A	-	N/A	
March										

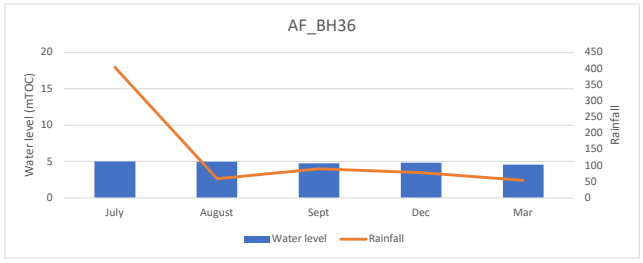
Month	Location	Borehole number	Temperature	Ph	Electrical Conductivity (µS/cm)	Dissolved Oxygen(mg/l)	Redox- (mV)	Visual (turbidity, odour, sheen)	Water level (TOC)	Water level (mAHD)	Sampled/gauged	Monitoring
		Deep, Shallow										
September	TBY	s02d, s02s	20.6	8.08	26.1	2.99	20.3	no odour, not turbid	3.2m,1.2		sampled, gauged	WQ/EC/L
December			20.6	6.3	26.2	20.1	340.2	no odour, not turbid	4.2m,1.32		sampled, gauged	
March			19.9, 18.8	6.2,6.7	9331, 4400	11.9, 88.6	101.2, 82.1	no odour, not turbid	2.82m,3m		sampled, sampled	
September	TBY	s06	20.4	7.12	14.7	8.21	230	no odour, not turbid	3.16m	3.64m	sampled	WQ/EC/L
December			22	6.65	38.6	34.6	220.6	no odour, not turbid	2.94m	3.64m	sampled	
March			18.8	6.2	10116	136.6	21.3	no odour, not turbid	2.15m	3.64m	sampled	
September	TBY	s58d, s58s	19.9	8.45	37.5	2.81	-100	no odour, not turbid	2.46m,1.2m		sampled, gauged	WQ/EC/L
December								no odour, not turbid	N/A, 1.3m		N/A,gauged	
March								no odour, not turbid	5.84m,2.88m		sampled, sampled	
September	TBY	s55	18.2	7.46	4282	3.9	77.4	no odour, not turbid	2.38m	3.130m	sampled	WQ/EC/L
December			19.1	5.7	140.3	8.6	120.6	no odour, not turbid	2.30m	3.130m	sampled	
March			19	5.8	76.6	6.2	90.2	no odour, not turbid	2.60m		sampled	
September	TBY	AF_CGW1						no odour, slightly turbid.	3.35m		gauged	WQ/EC/L
December									N/A		N/A	
March									N/A		N/A	
September	TBY	s40d, s40s	19.6	5.96	60	1.82	-129.3	no odour, not turbid	4.71m, 3.3m	4.846m,4.726m	sampled,gauged	WQ/EC/L
December									N/A	4.846m,4.726m	N/A	
March									N/A	4.846m,4.726m	N/A	
September	TBY	s54	20.5	5.29	190	8	220.4	no odour, not turbid	3.22m	3.919m	sampled	WQ/EC/L
December			19.2	6.6	160.1	7.8	320	no odour, not turbid	4.37m	3.919m	sampled	
March											gauged	

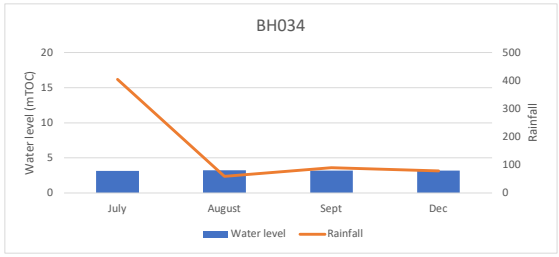
Month	Location	Borehole Number	Temperature	Ph	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/l)	Redox (mV)	Visual (turbidity, odour, sheen)	Water level (TOC)	Water level (mAHD)	Sampled/gauged	Monitoring
July	Burwood	BH046R							N/A		N/A	WQ/EC/L
August									12.72m		sampled	
November									N/A		N/A	
March									N/A		N/A	
July	Burwood	BH044						no odour	8.84m	22.733m	gauged	WQ/EC/L
August			20.9	6.81	6892	0.69	-16.2	no odour, not turbid	7.89m	22.733m	sampled	
November								no odour	8.01m	22.733m	gauged	
March								no odour		22.733m	N/A	
July	Five Dock	BH050						no odour	22.85m	24.285m	gauged	WQ/EC/L
August								no odour	22.96m	24.285m	gauged	
November								no odour	22.54m	24.285m	gauged	
March								no odour	23.6m	24.285m	gauged	
July	Five Dock	BH051	16.2	5.72	10.19	1.8	118.1	no odour, not turbid	2.81m	21.680m	sampled	WQ/EC/L
August			19.4	5.81	4712	4.12	74.2	no odour, not turbid	2.71m	21.680m	sampled	
November			20.1	5.66	2868	4.5	82	no odour, not turbid	2.75m	21.680m	sampled	
March			20.2	7.7	3110	162.3	88.6	no odour, not turbid	3m	21.680m	sampled	

Correlation between rainfall and groundwater level

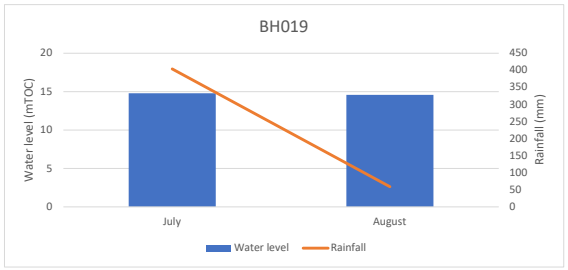
SITE- TUNNEL SOP-NS

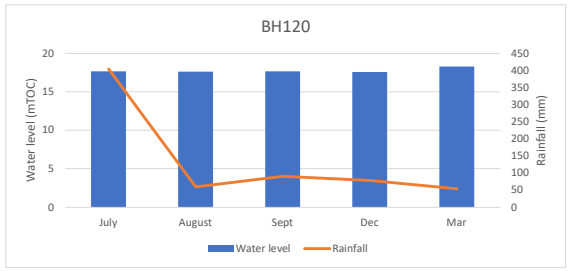


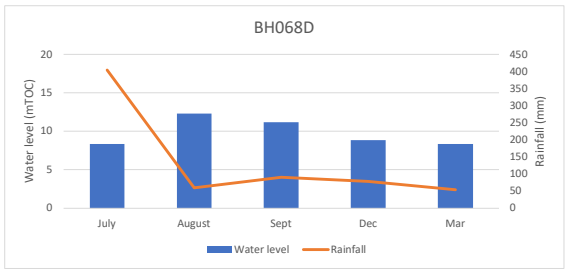


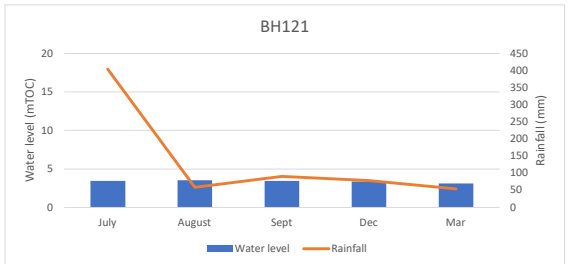


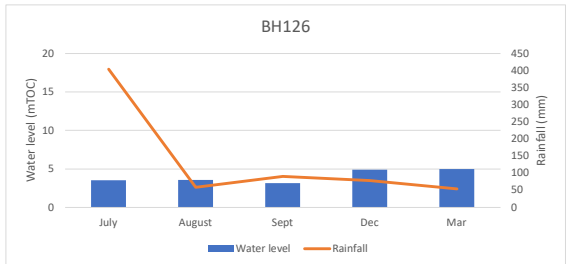
SITE- SYDNEY OLYMPIC PARK

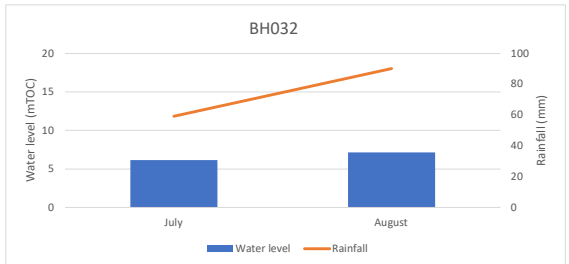


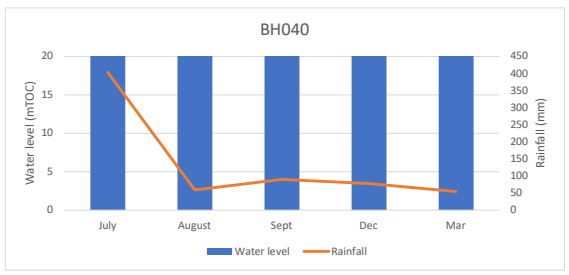




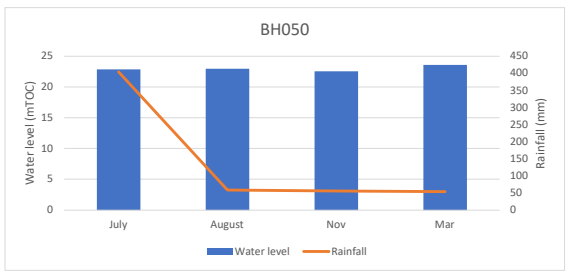


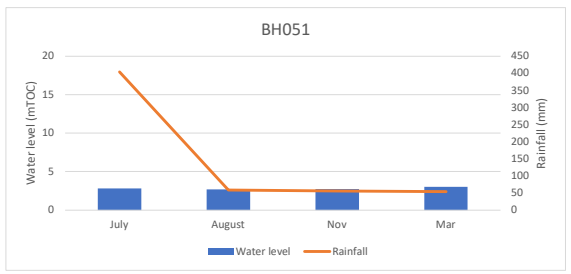




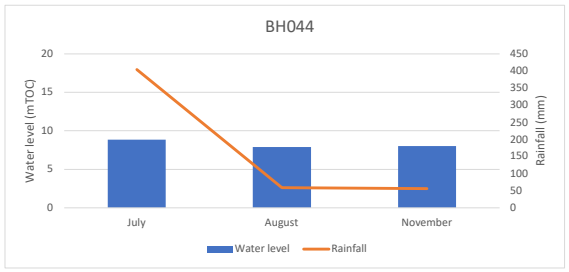


SITE- FIVE DOCK

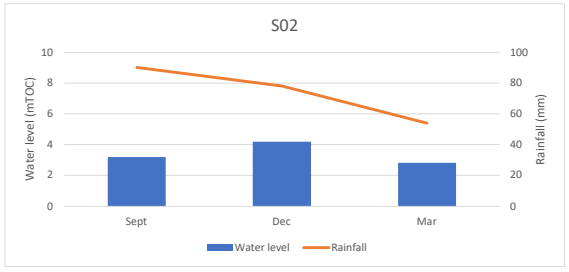


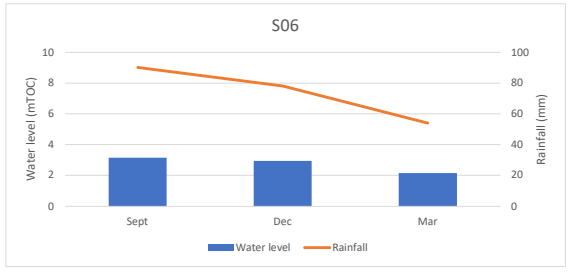


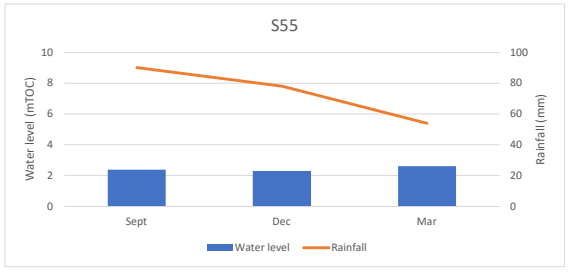
SITE- BURWOOD

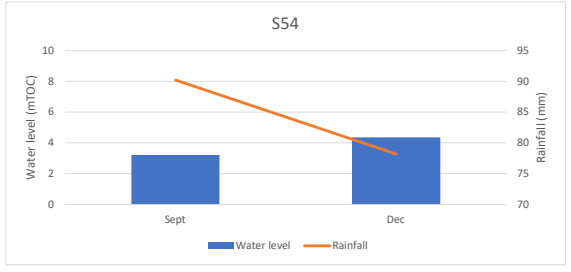


SITE- THE BAYS









Site			Sydney Olympic Park			Tunnel SOP-NS		
Month			March	March	March			March
Borehole numbers	Trigger values	Unit	SMW_BH120	SMW_BH068d	SMW_BH126	Trigger values	Unit	BH_715B
Calcium - Dissolved	499.2	mg/L	180	25	31	168	mg/L	110
Potassium - Dissolved	504	mg/L	45	4	350	79.2	mg/L	38
Sodium - Dissolved	4032	mg/L	3000	26	2100	5040	mg/L	390
Magnesium - Dissolved	568.8	mg/L	340	2	60	492	mg/L	14
Hardness	2760	mgCaCO3/L	1900	68	320	2400	mgCaCO3/L	320
Hydroxide Alkalinity (OH-) as CaCO3	50	mg/L	<5	<5	<5	50	mg/L	<5
Bicarbonate Alkalinity as CaCO3	1800	mg/L	610	110	1200	648	mg/L	240
Carbonate Alkalinity as CaCO3	50	mg/L	<5	<5	<5	32.4	mg/L	<5
Total Alkalinity as CaCO3	1800	mg/L	610	110	1200	648	mg/L	240
Sulphate, SO4	660	mg/L	530	52	2	660	mg/L	55
Chloride, Cl	8100	mg/L	6000	20	3400	7560	mg/L	720
Ionic Balance	22.8	%	-7	-19	-6	14.4	%	-4
Ammonia (as N in water)	348	mg/L	0.08	<0.005	210	2.4	mg/L	0.65
Nitrate as N in water	3.72	mg/L	0.85	0.02	0.077	2.04	mg/L	1.3
Total Nitrogen in water	372	mg/L	1.3	0.2	220	3.72	mg/L	1.9
Dichlorodifluoromethane	100	µg/L	<10	<10	<100	100	µg/L	<10
Chloromethane	100	µg/L	<10	<10	<100	100	µg/L	<10
Vinyl Chloride	10	µg/L	<10	<10	<100	10	µg/L	<10
Bromomethane	10	µg/L	<10	<10	<100	10	µg/L	<10
Chloroethane	100	µg/L	<10	<10	<100	100	µg/L	<10
Trichlorofluoromethane	100	µg/L	<10	<10	<100	100	µg/L	<10
1,1-Dichloroethene	10	µg/L	<1	<1	<10	10	µg/L	<1
Trans-1,2-dichloroethene	10	µg/L	<1	<1	<10	10	µg/L	<1
1,1-dichloroethane	10	µg/L	<1	<1	<10	10	µg/L	<1
Cis-1,2-dichloroethene	3.6	µg/L	<1	<1	<10	10	µg/L	<1
Bromochloromethane	10	µg/L	<1	<1	<10	10	µg/L	<1
Chloroform	10	µg/L	<1	<1	<10	10	µg/L	<1
2,2-dichloropropane	10	µg/L	<1	<1	<10	10	µg/L	<1
1,2-dichloroethane	10	µg/L	<1	<1	<10	10	µg/L	<1
1,1,1-trichloroethane	10	µg/L	<1	<1	<10	10	µg/L	<1
1,1-dichloropropene	10	µg/L	<1	<1	<10	10	µg/L	<1
Cyclohexane	15.6	µg/L	<1	<1	<10	10	µg/L	<1
Carbon tetrachloride	1	µg/L	<1	<1	<10	1	µg/L	<1
Benzene	76.8	µg/L	<1	<1	44	1	µg/L	<1
Dibromomethane	10	µg/L	<1	<1	<10	10	µg/L	<1
1,2-dichloropropane	10	µg/L	<1	<1	<10	10	µg/L	<1
Trichloroethene	1	µg/L	<1	<1	<10	1	µg/L	<1
Bromodichloromethane	1	µg/L	<1	<1	<10	1	µg/L	<1
trans-1,3-dichloropropene	10	µg/L	<1	<1	<10	10	µg/L	<1
cis-1,3-dichloropropene	10	µg/L	<1	<1	<10	10	µg/L	<1
1,1,2-trichloroethane	10	µg/L	<1	<1	<10	10	µg/L	<1
Toluene	3.6	µg/L	<1	<1	<10	1.2	µg/L	<1
1,3-dichloropropane	10	µg/L	<1	<1	<10	10	µg/L	<1
Dibromochloromethane	10	µg/L	<1	<1	<10	10	µg/L	<1
1,2-dibromoethane	10	µg/L	<1	<1	<10	10	µg/L	<1
Tetrachloroethene	10	µg/L	<1	<1	<10	10	µg/L	<1
1,1,1,2-tetrachloroethane	10	µg/L	<1	<1	<10	10	µg/L	<1
Chlorobenzene	42	µg/L	<1	<1	29	10	µg/L	<1
Ethylbenzene	2.4	µg/L	<1	<1	<10	10	µg/L	<1
Bromoform	10	µg/L	<1	<1	<10	10	µg/L	<1
m+p-xylene	2.4	µg/L	<2	<2	<20	20	µg/L	<2
Styrene	10	µg/L	<1	<1	<10	10	µg/L	<1
1,1,2,2-tetrachloroethane	10	µg/L	<1	<1	<10	10	µg/L	<1
o-xylene	1.2	µg/L	<1	<1	<10	10	µg/L	<1
1,2,3-trichloropropane	10	µg/L	<1	<1	<10	10	µg/L	<1
Isopropylbenzene	6	µg/L	<1	<1	<10	10	µg/L	<1
Bromobenzene	10	µg/L	<1	<1	<10	10	µg/L	<1
n-propyl benzene	6	µg/L	<1	<1	<10	10	µg/L	<1
2-chlorotoluene	10	µg/L	<1	<1	<10	10	µg/L	<1
4-chlorotoluene	10	µg/L	<1	<1	<10	10	µg/L	<1
1,3,5-trimethyl benzene	10	µg/L	<1	<1	<10	10	µg/L	<1
Tert-butyl benzene	10	µg/L	<1	<1	<10	10	µg/L	<1
1,2,4-trimethyl benzene	2.4	µg/L	<1	<1	<10	10	µg/L	<1
1,3-dichlorobenzene	10	µg/L	<1	<1	<10	10	µg/L	<1
Sec-butyl benzene	1.2	µg/L	<1	<1	<10	10	µg/L	<1
1,4-dichlorobenzene	10	µg/L	<1	<1	<10	10	µg/L	<1
4-isopropyl toluene	10	µg/L	<1	<1	<10	10	µg/L	<1
1,2-dichlorobenzene	10	µg/L	<1	<1	<10	10	µg/L	<1
n-butyl benzene	10	µg/L	<1	<1	<10	10	µg/L	<1
1,2-dibromo-3-chloropropane	1	µg/L	<1	<1	<10	1	µg/L	<1
1,2,4-trichlorobenzene	10	µg/L	<1	<1	<10	10	µg/L	<1
Hexachlorobutadiene	1	µg/L	<1	<1	<10	1	µg/L	<1
1,2,3-trichlorobenzene	10	µg/L	<1	<1	<10	10	µg/L	<1
TRH C6 - C9	264	µg/L	<10	<10	<100	100	µg/L	<10
TRH C6 - C10	300	µg/L	<10	<10	<100	100	µg/L	<10
TRH C6 - C10 lessBTEX (F1)	216	µg/L	<10	<10	<100	100	µg/L	<10
Benzene	76.8	µg/L	<1	<1	44	1	µg/L	<1
Toluene	3.6	µg/L	<1	<1	<10	1.2	µg/L	<1
Ethylbenzene	2.4	µg/L	<1	<1	<10	10	µg/L	<1
m+p-xylene	2.4	µg/L	<2	<2	<10	20	µg/L	<2
o-xylene	1.2	µg/L	<1	<1	<10	10	µg/L	<1
Naphthalene	28.8	µg/L	<1	<1	12	10	µg/L	<1
TRH C10 - C14	996	µg/L	<50	<50	520	216	µg/L	<50
TRH C15 - C28	1800	µg/L	<100	<100	1100	180	µg/L	<100
TRH C29 - C36	132	µg/L	<100	<100	110	1000	µg/L	<100

Total +ve TRH (C10-C36)	2760	µg/L	<50	<50	1700	396	µg/L	<50
TRH >C10 - C16	1320	µg/L	<50	<50	700	228	µg/L	<50
TRH >C10 - C16less Naphthalene (F2)	1320	µg/L	<50	<50	680	228	µg/L	<50
TRH >C16 - C34	1440	µg/L	<100	<100	940	168	µg/L	<100
TRH >C34 - C40	240	µg/L	<100	<100	<100	1000	µg/L	<100
Total +ve TRH (>C10-C40)	2760	µg/L	<50	<50	1600	384	µg/L	<50
Naphthalene	28.8	µg/L	<0.2	<0.2	10	10	µg/L	<0.2
Acenaphthylene	10	µg/L	<0.1	<0.1	<0.1	10	µg/L	<0.1
Acenaphthene	0.12	µg/L	<0.1	<0.1	0.1	10	µg/L	<0.1
Fluorene	10	µg/L	<0.1	<0.1	<0.1	10	µg/L	<0.1
Phenanthrene	0.12	µg/L	<0.1	<0.1	0.1	1	µg/L	<0.1
Anthracene	1	µg/L	<0.1	<0.1	<0.1	1	µg/L	<0.1
Fluoranthene	1	µg/L	<0.1	<0.1	<0.1	1	µg/L	<0.1
Pyrene	10	µg/L	<0.1	<0.1	<0.1	10	µg/L	<0.1
Benzo(a)anthracene	10	µg/L	<0.1	<0.1	<0.1	10	µg/L	<0.1
Chrysene	10	µg/L	<0.1	<0.1	<0.1	10	µg/L	<0.1
Benzo(b,j+k)fluoranthene	20	µg/L	<0.2	<0.2	<0.2	20	µg/L	<0.2
Benzo(a)pyrene	1	µg/L	<0.1	<0.1	<0.1	1	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	10	µg/L	<0.1	<0.1	<0.1	10	µg/L	<0.1
Dibenzo(a,h)anthracene	10	µg/L	<0.1	<0.1	<0.1	10	µg/L	<0.1
Benzo(g,h,i)perylene	10	µg/L	<0.1	<0.1	<0.1	10	µg/L	<0.1
Benzo(a)pyrene TEQ	50	µg/L	<0.5	<0.5	<0.5	50	µg/L	<0.5
Total +vePAH's	21.6	µg/L	<0.1	<0.1	11	10	µg/L	<0.1
Perfluorobutanesulfonic acid	0.264	µg/L	<0.01	<0.01	0.22	0.024	µg/L	0.02
Perfluoropentanesulfonic acid	0.192	µg/L	<0.01	<0.01	0.14	0.1	µg/L	<0.01
Perfluorohexanesulfonic acid - PFHxS	0.468	µg/L	<0.01	<0.01	0.39	0.024	µg/L	<0.01
Perfluoroheptanesulfonic acid	0.012	µg/L	<0.01	<0.01	<0.01	0.1	µg/L	<0.01
Perfluorooctanesulfonic acidPFOS	0.276	µg/L	<0.01	<0.01	0.2	0.1	µg/L	<0.01
Perfluorodecanesulfonic acid	0.192	µg/L	<0.02	<0.02	<0.02	0.2	µg/L	<0.02
Perfluorobutanoic acid	2.4	µg/L	<0.02	<0.02	1.8	0.2	µg/L	<0.02
Perfluoropentanoic acid	0.528	µg/L	<0.02	0.06	0.41	0.2	µg/L	<0.02
Perfluorohexanoic acid	1.068	µg/L	<0.01	0.02	0.63	0.012	µg/L	<0.01
Perfluoroheptanoic acid	0.264	µg/L	<0.01	<0.01	0.21	0.1	µg/L	<0.01
Perfluorooctanoic acid PFOA	0.78	µg/L	<0.01	<0.01	0.48	0.1	µg/L	<0.01
Perfluorononanoic acid	0.12	µg/L	<0.01	<0.01	0.06	0.1	µg/L	<0.01
Perfluorodecanoic acid	0.2	µg/L	<0.02	<0.02	<0.02	0.2	µg/L	<0.02
Perfluoroundecanoic acid	0.2	µg/L	<0.02	<0.02	<0.02	0.2	µg/L	<0.02
Perfluorododecanoic acid	0.5	µg/L	<0.05	<0.05	<0.05	0.5	µg/L	<0.05
Perfluorotridecanoic acid	1	µg/L	<0.1	<0.1	<0.1	1	µg/L	<0.1
Perfluorotetradecanoic acid	5	µg/L	<0.5	<0.5	<0.5	5	µg/L	<0.5
4:2 FTS	0.1	µg/L	<0.01	<0.01	<0.01	0.1	µg/L	<0.01
6:2 FTS	0.192	µg/L	<0.01	0.16	0.02	0.1	µg/L	<0.01
8:2 FTS	0.2	µg/L	<0.02	<0.02	<0.02	0.2	µg/L	<0.02
10:2 FTS	0.2	µg/L	<0.02	<0.02	<0.02	0.2	µg/L	<0.02
Perfluorooctane sulfonamide	1	µg/L	<0.1	<0.1	<0.1	1	µg/L	<0.1
N-Methyl perfluorooctane sulfonamide	0.5	µg/L	<0.05	<0.05	<0.05	0.5	µg/L	<0.05
N-Ethyl perfluorooctanesulfonamide	1	µg/L	<0.1	<0.1	<0.1	1	µg/L	<0.1
N-Me perfluorooctanesulfonamidoethanol	0.5	µg/L	<0.05	<0.05	<0.05	0.5	µg/L	<0.05
N-Et perfluorooctanesulfonamidoethanol	5	µg/L	<0.5	<0.5	<0.5	5	µg/L	<0.5
MePerfluorooctanesulf-amid oacetic acid	0.2	µg/L	<0.02	<0.02	<0.02	0.2	µg/L	<0.02
EtPerfluorooctanesulf-amid oacetic acid	0.12	µg/L	<0.02	<0.02	0.1	0.2	µg/L	<0.02
Total Positive PFHxS & PFOS	0.708	µg/L	<0.01	<0.01	0.59	0.024	µg/L	<0.01
Total Positive PFOA & PFOS	1.032	µg/L	<0.01	<0.01	0.68	0.1	µg/L	<0.01
Total Positive PFAS	5.64	µg/L	<0.01	0.24	4.7	0.024	µg/L	0.02
Arsenic-Dissolved	32.4	µg/L	<1	<1	3	2.4	µg/L	1
Boron-Dissolved	2280	µg/L	100	30	1500	408	µg/L	40
Barium-Dissolved	6840	µg/L	96	55	950	240	µg/L	76
Beryllium-Dissolved	5	µg/L	<0.5	<0.5	<0.5	0.84	µg/L	<0.5
Cadmium-Dissolved	0.12	µg/L	<0.1	<0.1	<0.1	0.24	µg/L	<0.1
Chromium-Dissolved	19.2	µg/L	<1	<1	14	1	µg/L	<1
Copper-Dissolved	13.2	µg/L	7	1	2	7.2	µg/L	5
Cobalt-Dissolved	13.2	µg/L	2	<1	8	28.8	µg/L	4
Mercury-Dissolved	0.05	µg/L	<0.05	<0.05	<0.05	0.05	µg/L	<0.05
Manganese-Dissolved	357.6	µg/L	140	20	32	1440	µg/L	140
Molybdenum-Dissolved	74.4	µg/L	7	7	3	31.2	µg/L	9
Nickel-Dissolved	58.8	µg/L	21	1	25	168	µg/L	10
Lead-Dissolved	1	µg/L	<1	<1	<1	1	µg/L	<1
Antimony-Dissolved	4.8	µg/L	<1	<1	<1	4.8	µg/L	<1
Selenium-Dissolved	2.4	µg/L	<1	<1	<1	1	µg/L	<1
Tin-Dissolved	10	µg/L	<1	<1	<1	10	µg/L	<1
Zinc-Dissolved	216	µg/L	110	<1	17	132	µg/L	20
Iron-Dissolved	6936	µg/L	<10	<10	210	4200	µg/L	20
Arsenic-Total	9.6	µg/L	<1	5	5	14.4	µg/L	1
Boron-Total	2040	µg/L	100	30	1600	408	µg/L	200
Barium-Total	7080	µg/L	93	210	1200	1032	µg/L	82
Beryllium-Total	1.08	µg/L	<0.5	0.9	<0.5	20.4	µg/L	<0.5
Cadmium-Total	0.48	µg/L	<0.1	0.2	<0.1	2.04	µg/L	<0.1
Chromium-Total	63.6	µg/L	4	17	30	46.8	µg/L	9
Copper-Total	49.2	µg/L	9	36	8	372	µg/L	8
Cobalt-Total	50.4	µg/L	3	9	11	120	µg/L	24
Mercury-Total	0.05	µg/L	<0.05	<0.05	<0.05	0.6	µg/L	<0.05
Manganese-Total	312	µg/L	160	260	53	4560	µg/L	990
Molybdenum-Total	74.4	µg/L	8	7	3	30	µg/L	9
Nickel-Total	64.8	µg/L	22	17	32	192	µg/L	25
Lead-Total	74.4	µg/L	<1	12	8	204	µg/L	<1
Antimony-Total	6	µg/L	1	1	<1	3.6	µg/L	<1
Selenium-Total	2.4	µg/L	<1	<1	1	2.4	µg/L	<1
Tin-Total	3.6	µg/L	<1	<1	<1	1.2	µg/L	<1
Zinc-Total	360	µg/L	84	96	49	1032	µg/L	46
Iron-Total	20400	µg/L	250	12000	5300	91200	µg/L	1200

Sites	Tunnel-NW of SOP			Burwood			Five Dock		
Month			March			March			Feb
Borehole number	Trigger values	Unit	SMW_BH121	Trigger values	Unit	SMW_BH046R	Trigger values	Unit	SMW_BH051
Calcium - Dissolved	1680	mg/L	1100	192	mg/L	150	92.4	mg/L	13
Potassium - Dissolved	372	mg/L	310	42	mg/L	32	24	mg/L	8
Sodium - Dissolved	12000	mg/L	9600	2640	mg/L	1800	1356	mg/L	350
Magnesium - Dissolved	1068	mg/L	110	324	mg/L	270	55920	mg/L	22
Hardness	8400	mgCaCO3/L	3100	1800	mgCaCO3/L	1500	600	mgCaCO3/L	120
Hydroxide Alkalinity (OH-) as CaCO3	50	mg/L	<5	117.6	mg/L	<5	50	mg/L	<5
Bicarbonate Alkalinity as CaCO3	216	mg/L	48	636	mg/L	470	930	mg/L	70
Carbonate Alkalinity as CaCO3	50	mg/L	<5	50	mg/L	<5	50	mg/L	<5
Total Alkalinity as CaCO3	216	mg/L	48	834	mg/L	470	930	mg/L	70
Sulphate, SO4	2880	mg/L	2300	648	mg/L	530	576	mg/L	140
Chloride, Cl	21600	mg/L	15000	4800	mg/L	3600	2160	mg/L	550
Ionic Balance	10.8	%	2	10.596	%	-6	7.344	%	-5
Ammonia (as N in water)	6	mg/L	4.5	0.552	mg/L	0.34	11.88	mg/L	0.1
Nitrate as N in water	0.228	mg/L	0.19	0.756	mg/L	<0.005	2.04	mg/L	0.28
Total Nitrogen in water	7.44	mg/L	6.2	1.44	mg/L	0.4	12	mg/L	0.5
Dichlorodifluoromethane	100	µg/L	<10	100	µg/L	<100	100	µg/L	<10
Chloromethane	100	µg/L	<10	100	µg/L	<100	100	µg/L	<10
Vinyl Chloride	10	µg/L	<10	10	µg/L	<100	10	µg/L	<10
Bromomethane	10	µg/L	<10	10	µg/L	<100	10	µg/L	<10
Chloroethane	100	µg/L	<10	100	µg/L	<100	100	µg/L	<10
Trichlorofluoromethane	100	µg/L	<10	100	µg/L	<100	100	µg/L	<10
1,1-Dichloroethene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Trans-1,2-dichloroethene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,1-dichloroethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Cis-1,2-dichloroethene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Bromochloromethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Chloroform	10	µg/L	<1	1.2	µg/L	<10	10	µg/L	<1
2,2-dichloropropane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,2-dichloroethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,1,1-trichloroethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,1-dichloropropene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Cyclohexane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Carbon tetrachloride	1	µg/L	<1	1	µg/L	<10	1	µg/L	<1
Benzene	1	µg/L	<1	1	µg/L	<10	1	µg/L	<1
Dibromomethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,2-dichloropropane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Trichloroethene	1	µg/L	<1	1	µg/L	<10	1	µg/L	<1
Bromodichloromethane	1	µg/L	<1	1	µg/L	<10	1	µg/L	<1
trans-1,3-dichloropropene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
cis-1,3-dichloropropene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,1,2-trichloroethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Toluene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,3-dichloropropane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Dibromochloromethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,2-dibromoethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Tetrachloroethene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,1,1,2-tetrachloroethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Chlorobenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Ethylbenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Bromoform	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
m+p-xylene	20	µg/L	<2	20	µg/L	<20	20	µg/L	<2
Styrene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,1,2,2-tetrachloroethane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
o-xylene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,2,3-trichloropropane	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Isopropylbenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Bromobenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
n-propyl benzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
2-chlorotoluene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
4-chlorotoluene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,3,5-trimethyl benzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Tert-butyl benzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,2,4-trimethyl benzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,3-dichlorobenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Sec-butyl benzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,4-dichlorobenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
4-isopropyl toluene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,2-dichlorobenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
n-butyl benzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
1,2-dibromo-3-chloropropane	1	µg/L	<1	1	µg/L	<10	1	µg/L	<1
1,2,4-trichlorobenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Hexachlorobutadiene	1	µg/L	<1	1	µg/L	<10	1	µg/L	<1
1,2,3-trichlorobenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
TRH C6 - C9	100	µg/L	<10	100	µg/L	<100	100	µg/L	<10
TRH C6 - C10	100	µg/L	<10	100	µg/L	<100	48	µg/L	<10
TRH C6 - C10 lessBTEX (F1)	100	µg/L	<10	100	µg/L	<100	48	µg/L	<10
Benzene	1	µg/L	<1	1	µg/L	<10	1	µg/L	<1
Toluene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Ethylbenzene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
m+p-xylene	20	µg/L	<2	20	µg/L	<20	20	µg/L	<2
o-xylene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
Naphthalene	10	µg/L	<1	10	µg/L	<10	10	µg/L	<1
TRH C10 - C14	156	µg/L	110	500	µg/L	<50	500	µg/L	<50
TRH C15 - C28	1000	µg/L	<100	516	µg/L	<100	156	µg/L	<100
TRH C29 - C36	1000	µg/L	<100	1000	µg/L	<100	1000	µg/L	<100

Total +ve TRH (C10-C36)	156	µg/L	110	864	µg/L	<50	156	µg/L	<50
TRH >C10 - C16	168	µg/L	110	684	µg/L	<50	500	µg/L	<50
TRH >C10 - C16less Naphthalene (F2)	168	µg/L	110	684	µg/L	<50	500	µg/L	<50
TRH >C16 - C34	1000	µg/L	<100	228	µg/L	<100	216	µg/L	<100
TRH >C34 - C40	1000	µg/L	<100	1000	µg/L	<100	1000	µg/L	<100
Total +ve TRH (>C10-C40)	168	µg/L	110	912	µg/L	<50	216	µg/L	<50
Naphthalene	10	µg/L	<0.2	10	µg/L	<0.2	10	µg/L	<0.2
Acenaphthylene	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Acenaphthene	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Fluorene	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Phenanthrene	1	µg/L	<0.1	1	µg/L	<0.1	1	µg/L	<0.1
Anthracene	1	µg/L	<0.1	1	µg/L	<0.1	1	µg/L	<0.1
Fluoranthene	1	µg/L	<0.1	1	µg/L	<0.1	1	µg/L	<0.1
Pyrene	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Benzo(a)anthracene	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Chrysene	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Benzo(b,j+k)fluoranthene	20	µg/L	<0.2	20	µg/L	<0.2	20	µg/L	<0.2
Benzo(a)pyrene	1	µg/L	<0.1	1	µg/L	<0.1	1	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Dibenzo(a,h)anthracene	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Benzo(g,h,i)perylene	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Benzo(a)pyrene TEQ	50	µg/L	<0.5	50	µg/L	<0.5	50	µg/L	<0.5
Total +vePAH's	10	µg/L	<0.1	10	µg/L	<0.1	10	µg/L	<0.1
Perfluorobutanesulfonic acid	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.036	µg/L	<0.01
Perfluoropentanesulfonic acid	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.1	µg/L	<0.01
Perfluorohexanesulfonic acid - PFHxS	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.048	µg/L	<0.01
Perfluoroheptanesulfonic acid	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.1	µg/L	<0.01
Perfluorooctanesulfonic acidPFOS	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.024	µg/L	<0.01
Perfluorodecanesulfonic acid	0.2	µg/L	<0.02	0.2	µg/L	<0.02	0.552	µg/L	<0.02
Perfluorobutanoic acid	0.2	µg/L	<0.02	0.2	µg/L	<0.02	0.2	µg/L	<0.02
Perfluoropentanoic acid	0.2	µg/L	<0.02	0.2	µg/L	<0.02	0.168	µg/L	<0.02
Perfluorohexanoic acid	0.012	µg/L	0.01	0.1	µg/L	<0.01	0.18	µg/L	<0.01
Perfluoroheptanoic acid	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.036	µg/L	<0.01
Perfluorooctanoic acid PFOA	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.06	µg/L	<0.01
Perfluorononanoic acid	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.1	µg/L	<0.01
Perfluorodecanoic acid	0.2	µg/L	<0.02	0.2	µg/L	<0.02	0.2	µg/L	<0.02
Perfluoroundecanoic acid	0.2	µg/L	<0.02	0.2	µg/L	<0.02	0.2	µg/L	<0.02
Perfluorododecanoic acid	0.5	µg/L	<0.05	0.5	µg/L	<0.05	0.5	µg/L	<0.05
Perfluorotridecanoic acid	1	µg/L	<0.1	1	µg/L	<0.1	1	µg/L	<0.1
Perfluorotetradecanoic acid	5	µg/L	<0.5	5	µg/L	<0.5	5	µg/L	<0.5
4:2 FTS	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.1	µg/L	<0.01
6:2 FTS	0.072	µg/L	0.06	0.36	µg/L	<0.01	0.156	µg/L	<0.01
8:2 FTS	0.2	µg/L	<0.02	0.2	µg/L	<0.02	0.2	µg/L	<0.02
10:2 FTS	0.2	µg/L	<0.02	0.2	µg/L	<0.02	0.2	µg/L	<0.02
Perfluorooctane sulfonamide	1	µg/L	<0.1	1	µg/L	<0.1	1	µg/L	<0.1
N-Methyl perfluorooctane sulfonamide	0.5	µg/L	<0.05	0.5	µg/L	<0.05	0.5	µg/L	<0.05
N-Ethyl perfluorooctanesulfonamide	1	µg/L	<0.1	1	µg/L	<0.1	1	µg/L	<0.1
N-Me perfluorooctanesulfonamidoethanol	0.5	µg/L	<0.05	0.5	µg/L	<0.05	0.5	µg/L	<0.05
N-Et perfluorooctanesulfonamidoethanol	5	µg/L	<0.5	5	µg/L	<0.5	5	µg/L	<0.5
MePerfluorooctanesulf-amid oacetic acid	0.2	µg/L	<0.02	0.2	µg/L	<0.02	0.2	µg/L	<0.02
EtPerfluorooctanesulf-amid oacetic acid	0.2	µg/L	<0.02	0.2	µg/L	<0.02	0.2	µg/L	<0.02
Total Positive PFHxS & PFOS	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.1	µg/L	<0.01
Total Positive PFOA & PFOS	0.1	µg/L	<0.01	0.1	µg/L	<0.01	0.1	µg/L	<0.01
Total Positive PFAS	0.084	µg/L	0.07	0.36	µg/L	<0.01	0.552	µg/L	<0.01
Arsenic-Dissolved	1	µg/L	<1	20.4	µg/L	<1	3.6	µg/L	<1
Boron-Dissolved	516	µg/L	430	120	µg/L	100	72	µg/L	30
Barium-Dissolved	204	µg/L	170	43.2	µg/L	36	82.8	µg/L	12
Beryllium-Dissolved	5	µg/L	<0.5	5	µg/L	<0.5	5	µg/L	<0.5
Cadmium-Dissolved	0.1	µg/L	<0.1	0.48	µg/L	<0.1	0.12	µg/L	0.1
Chromium-Dissolved	2.4	µg/L	2	1	µg/L	<1	1	µg/L	<1
Copper-Dissolved	24000	µg/L	410	39.6	µg/L	<1	13.2	µg/L	7
Cobalt-Dissolved	1.2	µg/L	1	1.2	µg/L	<1	156	µg/L	39
Mercury-Dissolved	0.05	µg/L	<0.05	0.05	µg/L	<0.05	0.05	µg/L	<0.05
Manganese-Dissolved	4080	µg/L	22	1092	µg/L	910	52800	µg/L	17000
Molybdenum-Dissolved	20.4	µg/L	17	6	µg/L	1	3.6	µg/L	1
Nickel-Dissolved	144	µg/L	9	33.6	µg/L	3	312	µg/L	31
Lead-Dissolved	1	µg/L	<1	1	µg/L	<1	1	µg/L	<1
Antimony-Dissolved	2.4	µg/L	2	3.6	µg/L	<1	1.2	µg/L	<1
Selenium-Dissolved	1	µg/L	<1	1	µg/L	<1	1	µg/L	<1
Tin-Dissolved	10	µg/L	<1	1.2	µg/L	<1	10	µg/L	<1
Zinc-Dissolved	112.8	µg/L	16	18	µg/L	8	288	µg/L	200
Iron-Dissolved	1800	µg/L	<10	2400	µg/L	880	1440	µg/L	30
Arsenic-Total	2.4	µg/L	1	10.8	µg/L	<1	10.8	µg/L	1
Boron-Total	528	µg/L	390	108	µg/L	80	84	µg/L	40
Barium-Total	252	µg/L	190	192	µg/L	34	276	µg/L	26
Beryllium-Total	5	µg/L	<0.5	1.2	µg/L	0.5	3.6	µg/L	<0.5
Cadmium-Total	0.1	µg/L	<0.1	0.12	µg/L	<0.1	1.8	µg/L	0.3
Chromium-Total	19.2	µg/L	12	19.2	µg/L	<1	60	µg/L	4
Copper-Total	108000	µg/L	3400	348	µg/L	<1	240	µg/L	34
Cobalt-Total	2.4	µg/L	2	7.2	µg/L	<1	300	µg/L	60
Mercury-Total	0.096	µg/L	<0.05	0.05	µg/L	<0.05	0.096	µg/L	<0.05
Manganese-Total	2760	µg/L	36	1200	µg/L	910	84000	µg/L	21000
Molybdenum-Total	24	µg/L	19	6	µg/L	1	4.8	µg/L	2
Nickel-Total	117.6	µg/L	23	31.2	µg/L	<1	372	µg/L	47
Lead-Total	7.2	µg/L	<1	10.8	µg/L	<1	57.6	µg/L	9
Antimony-Total	2.4	µg/L	2	3.6	µg/L	<1	2.4	µg/L	1
Selenium-Total	1	µg/L	<1	1	µg/L	<1	1	µg/L	<1
Tin-Total	1.2	µg/L	<1	7.2	µg/L	2	8.4	µg/L	<1
Zinc-Total	99.6	µg/L	22	103.2	µg/L	2	996	µg/L	340
Iron-Total	11040	µg/L	910	13200	µg/L	2800	15600	µg/L	880

Sites			North Strathfield														
Month			March	April	May	March	April	May	March	April	May	March	April	May	March	April	May
Borehole number	Trigger values	Unit	SMW_BH035s			SMW_BH009			SMW_BH009S			SMW_BH035			SMW_B H038		
Calcium - Dissolved	681.6	mg/L	160	27	37	220	45	250	65	270	37	34	410	390	230	280	260
Potassium - Dissolved	54	mg/L	24	5	6	18	4	17	5	19	3	4	40	40	3	4	3
Sodium - Dissolved	3120	mg/L	1200	340	450	220	99	220	160	190	87	340	1700	2300	58	95	100
Magnesium - Dissolved	7308	mg/L	150	12	22	<0.5	13	<0.5	20	<0.5	10	12	260	260	<0.5	<0.5	<0.5
Hardness	2520	mgCaCO3 /L	1000	120	180	550	170	610	250	670	130	130	2100	2000	580	710	660
Hydroxide Alkalinity (OH-) as CaCO3	768	mg/L	<5	<5	<5	610	<5	640	<5	540	<5	<5	<5	<5	230	350	440
Bicarbonate Alkalinity as CaCO3	778.8	mg/L	500	94	100	<5	240	<5	280	<5	210	150	560	600	<5	<5	<5
Carbonate Alkalinity as CaCO3	74.4	mg/L	<5	<5	<5	59	<5	57	<5	60	<5	<5	<5	<5	62	59	40
Total Alkalinity as CaCO3	840	mg/L	500	94	100	670	240	700	280	600	210	150	560	600	290	410	490
Sulphate, SO4	600	mg/L	24	230	310	17	60	<1	91	24	57	240	32	22	280	260	260
Chloride, Cl	6948	mg/L	2400	360	610	280	90	290	180	310	66	390	4100	4000	92	170	140
Ionic Balance	8.4	%	-2	2	-4	-1	-5	0	-1	2	-4	-4	-4	7	0	0	-4
Ammonia (as N in water)	1.68	mg/L	0.64	0.066	0.096	0.86	<0.005	0.91	0.043	0.69	0.036	0.071	0.93	1.4	0.074	<0.005	0.007
Nitrate as N in water	2.4	mg/L	1.4	0.072	0.13	1.1	0.02	0.82	0.04	1.5	0.02	0.02	0.89	2	0.53	0.74	0.51
Total Nitrogen in water	3.6	mg/L	2.6	0.3	0.5	2.5	0.1	3	0.4	3	0.2	0.2	2.2	2.5	0.7	1	1
Dichlorodifluoromethane	100	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloromethane	100	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Vinyl Chloride	10	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromomethane	10	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloroethane	100	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	100	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1,1-Dichloroethene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-dichloroethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,2-dichloropropane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-dichloroethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-trichloroethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-dichloropropene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cyclohexane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	1	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	1	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-dichloropropane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	1	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	1	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-trichloroethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-dichloropropane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	20	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Styrene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
o-xylene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-trichloropropane	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-propyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-chlorotoluene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-chlorotoluene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tert-butyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-dichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sec-butyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-dichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-isopropyl toluene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-dichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-butyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	1	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TRH C6 - C9	100	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
TRH C6 - C10	100	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
TRH C6 - C10 lessBTEX (F1)	100	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzene	1	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	20	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-xylene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	10	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TRH C10 - C14	96	µg/L	<50	<50	<50	<50	<50	<50	80	<50	<50	<50	<50	<50	<50	<50	<50
TRH C15 - C28	360	µg/L	<100	<100	<100	<100	<100	<100	300	<100	<100	<100	<100	<100	<100	<100	<100
TRH C29 - C36	516	µg/L	<100	<100	<100	<100	<100	<100	430	<100	<100	<100	<100	<100	<100	<100	<100

Total +ve TRH (C10-C36)	**972**	**µg/L**	<50	<50	<50	<50	<50	<50	810	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C10 - C16	**76.8**	**µg/L**	<50	<50	<50	<50	<50	<50	64	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C10 - C16less Naphthalene (F2)	**76.8**	**µg/L**	<50	<50	<50	<50	<50	<50	64	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C16 - C34	**684**	**µg/L**	<100	<100	<100	<100	<100	<100	570	<100	<100	<100	<100	<100	<100	<100	<100
TRH >C34 - C40	**252**	**µg/L**	<100	<100	<100	<100	<100	<100	210	<100	<100	<100	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	**1008**	**µg/L**	<50	<50	<50	<50	<50	<50	840	<50	<50	<50	<50	<50	<50	<50	<50
Naphthalene	**10**	**µg/L**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	**1**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	**1**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	**1**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	**20**	**µg/L**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	**1**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	**50**	**µg/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +vePAH's	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorobutanesulfonic acid	**0.06**	**µg/L**	<0.01	<0.01	<0.01	0.02	<0.01	0.05	0.01	0.03	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01
Perfluoropentanesulfonic acid	**0.1**	**µg/L**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	**0.036**	**µg/L**	<0.01	0.03	0.03	0.01	0.02	<0.01	0.03	0.01	0.01	0.03	<0.01	<0.01	<0.01	<0.01	0.01
Perfluoroheptanesulfonic acid	**0.1**	**µg/L**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanesulfonic acidPFOS	**0.06**	**µg/L**	<0.01	0.02	0.02	0.01	0.02	0.02	0.03	<0.01	0.02	0.03	<0.01	<0.01	0.01	<0.01	<0.01
Perfluorodecanesulfonic acid	**1.26**	**µg/L**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid	**0.024**	**µg/L**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02
Perfluoropentanoic acid	**0.036**	**µg/L**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.02
Perfluorohexanoic acid	**0.12**	**µg/L**	<0.01	0.01	0.01	0.01	<0.01	0.01	0.02	0.01	<0.01	0.02	<0.01	<0.01	0.01	0.01	0.02
Perfluoroheptanoic acid	**0.012**	**µg/L**	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanoic acid PFOA	**0.036**	**µg/L**	<0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid	**0.1**	**µg/L**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecanoic acid	**0.2**	**µg/L**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	**0.2**	**µg/L**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid	**0.5**	**µg/L**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid	**1**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	**5**	**µg/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	**0.1**	**µg/L**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
6:2 FTS	**1.188**	**µg/L**	<0.01	<0.01	<0.01	0.12	<0.01	0.1	<0.01	0.12	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01
8:2 FTS	**0.2**	**µg/L**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
10:2 FTS	**0.2**	**µg/L**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	**1**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	**0.5**	**µg/L**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfonamide	**1**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamidoethanol	**0.5**	**µg/L**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamidoethanol	**5**	**µg/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	**0.2**	**µg/L**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EtPerfluorooctanesulf-amid oacetic acid	**0.2**	**µg/L**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Total Positive PFHxS & PFOS	**0.072**	**µg/L**	<0.01	0.05	0.04	0.03	0.04	0.02	0.06	0.01	0.03	0.06	<0.01	<0.01	0.01	<0.01	0.01
Total Positive PFOA & PFOS	**0.06**	**µg/L**	<0.01	0.03	0.03	0.03	0.04	0.03	0.05	0.02	0.02	0.05	<0.01	<0.01	0.01	<0.01	<0.01
Total Positive PFAS	**1.26**	**µg/L**	<0.01	0.09	0.07	0.2	0.06	0.19	0.16	0.19	0.03	0.17	<0.01	<0.01	0.05	0.01	0.08
Arsenic-Dissolved	**4.8**	**µg/L**	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boron-Dissolved	**120**	**µg/L**	50	100	70	<20	100	<20	100	30	70	90	70	50	<20	40	<20
Barium-Dissolved	**3720**	**µg/L**	1400	46	41	670	52	650	76	680	53	37	2100	3100	80	120	110
Beryllium-Dissolved	**5**	**µg/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium-Dissolved	**0.48**	**µg/L**	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	**69.6**	**µg/L**	<1	<1	<1	58	<1	57	<1	56	<1	<1	<1	<1	9	14	13
Copper-Dissolved	**9.6**	**µg/L**	2	3	1	7	6	8	5	8	2	<1	<1	1	8	4	5
Cobalt-Dissolved	**114**	**µg/L**	4	24	39	3	1	3	23	3	7	29	5	4	<1	<1	<1
Mercury-Dissolved	**0.05**	**µg/L**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Dissolved	**3480**	**µg/L**	150	1300	2900	<5	230	<5	1800	<5	980	1600	190	250	<5	<5	<5
Molybdenum-Dissolved	**50.4**	**µg/L**	2	1	1	42	1	42	2	41	3	<1	1	1	5	6	7
Nickel-Dissolved	**126**	**µg/L**	11	20	35	2	5	3	13	3	4	15	11	12	<1	1	<1
Lead-Dissolved	**49.2**	**µg/L**	<1	41	<1	1	<1	1	<1	1	<1	<1	<1	<1	<1	<1	<1
Antimony-Dissolved	**2.4**	**µg/L**	<1	<1	<1	1	<1	1	<1	<1	<1	<1	<1	<1	2	1	1
Selenium-Dissolved	**1**	**µg/L**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tin-Dissolved	**10**	**µg/L**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc-Dissolved	**583.2**	**µg/L**	10	180	190	<1	44	22	20	24	16	85	18	13	3	4	3
Iron-Dissolved	**5760**	**µg/L**	<10	1900	1900	150	<10	180	<10	170	<10	690	10	<10	<10	<10	<10
Arsenic-Total	**62.4**	**µg/L**	4	10	18	<1	3	<1	52	<1	5	10	<1	1	<1	<1	<1
Boron-Total	**120**	**µg/L**	60	100	70	<20	100	<20	100	20	80	100	80	60	20	30	20
Barium-Total	**11640**	**µg/L**	9300	310	890	760	770	650	9700	760	990	660	5000	6800	89	170	120
Beryllium-Total	**37.2**	**µg/L**	<0.5	14	22	<0.5	1	<0.5	31	<0.5	1	7	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium-Total	**1.632**	**µg/L**	<0.1	1	1	<0.1	<0.1	<0.1	0.8	<0.1	0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Total	**102**	**µg/L**	18	45	80	65	24	69	71	85	8	29	9	25	10	27	29
Copper-Total	**816**	**µg/L**	18	200	420	9	20	11	680	12	36	150	4	12	17	9	10
Cobalt-Total	**336**	**µg/L**	9	75	100	3	15	3	280	4	17	59	6	5	<1	<1	<1
Mercury-Total	**1.128**	**µg/L**	0.06	0.05	0.1	<0.05	0.1	<0.05	0.94	<0.05	0.1	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Total	**10200**	**µg/L**	230	2600	4700	<5	930	13	8500	18	1200	2300	240	250	19	11	15
Molybdenum-Total	**58.8**	**µg/L**	2	1	2	44	3	41	5	49	2	2	3	3	5	8	7
Nickel-Total	**168**	**µg/L**	16	77	140	4	15	11	120	12	11	58	15	32	5	6	9
Lead-Total	**312**	**µg/L**	15	54	110	2	11	2	260	2	17	34	2	4	2	1	1
Antimony-Total	**2.4**	**µg/L**	1	<1	<1	1	<1	<1	1	1	<1	<1	<1	<1	2	2	2
Selenium-Total	**4.8**	**µg/L**	<1	<1	1	<1	<1	<1	4	<1	<1	<1	<1	<1	<1	<1	<1
Tin-Total	**14.4**	**µg/L**	2	<1	3	<1	<1	<1	5	<1	<1	3	<1	12	<1	<1	<1
Zinc-Total	**1320**	**µg/L**	51	700	1100	13	61	42	880	40	64	660	25	74	36	19	17
Iron-Total	**120000**	**µg/L**	7100	49000	100000	290	4200	440	48000	620	7100	38000	1400	2500	380	270	650

Site			The Bays					
Month			March	March	March	March	March	March
Borehole number	Trigger values	Unit	S_02s	S_02d	S06	S55	S_58s	S_58d
Calcium - Dissolved	564	mg/L	56	27	36	420	45	17
Potassium - Dissolved	540	mg/L	15	24	35	370	4	1
Sodium - Dissolved	13200	mg/L	29	360	110	9300	170	5
Magnesium - Dissolved	1680	mg/L	3	13	22	1300	19	0.7
Hardness	8400	mgCaCO3/L	150	120	180	6400	190	45
Hydroxide Alkalinity (OH-) as CaCO3	50	mg/L	<5	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as CaCO3	972	mg/L	810	750	630	150	35	40
Carbonate Alkalinity as CaCO3	50	mg/L	<5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	972	mg/L	810	750	630	150	35	40
Sulphate, SO4	3000	mg/L	24	150	22	2500	300	20
Chloride, Cl	20400	mg/L	32	570	160	17000	210	8
Ionic Balance	16.8	%	-58	-30	-31	-1	-6	-12
Ammonia (as N in water)	6.48	mg/L	0.52	0.48	1.3	0.11	0.078	0.069
Nitrate as N in water	1.2	mg/L	0.057	<0.005	1	0.17	0.06	0.18
Total Nitrogen in water	7.44	mg/L	1	0.8	1.5	0.4	0.5	0.5
Dichlorodifluoromethane	100	µg/L	<10	<10	<10	<10	<10	<10
Chloromethane	100	µg/L	<10	<10	<10	<10	<10	<10
Vinyl Chloride	10	µg/L	<10	<10	<10	<10	<10	<10
Bromomethane	10	µg/L	<10	<10	<10	<10	<10	<10
Chloroethane	100	µg/L	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	100	µg/L	<10	<10	<10	<10	<10	<10
1,1-Dichloroethene	10	µg/L	<1	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	10	µg/L	<1	<1	<1	<1	<1	<1
1,1-dichloroethane	10	µg/L	<1	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	10	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	10	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	1.2	µg/L	<1	1	<1	<1	<1	<1
2,2-dichloropropane	10	µg/L	<1	<1	<1	<1	<1	<1
1,2-dichloroethane	10	µg/L	<1	<1	<1	<1	<1	<1
1,1,1-trichloroethane	10	µg/L	<1	<1	<1	<1	<1	<1
1,1-dichloropropene	10	µg/L	<1	<1	<1	<1	<1	<1
Cyclohexane	10	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	1	µg/L	<1	<1	<1	<1	<1	<1
Benzene	1	µg/L	<1	<1	<1	<1	<1	<1
Dibromomethane	10	µg/L	<1	<1	<1	<1	<1	<1
1,2-dichloropropane	10	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	1	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	1	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	10	µg/L	<1	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	10	µg/L	<1	<1	<1	<1	<1	<1
1,1,2-trichloroethane	10	µg/L	<1	<1	<1	<1	<1	<1
Toluene	10	µg/L	<1	<1	<1	<1	<1	<1
1,3-dichloropropane	10	µg/L	<1	<1	<1	<1	<1	<1
Dibromochloromethane	10	µg/L	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	10	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	10	µg/L	<1	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	10	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	10	µg/L	<1	<1	<1	<1	<1	<1
Bromoform	10	µg/L	<1	<1	<1	<1	<1	<1
m+p-xylene	20	µg/L	<2	<2	<2	<2	<2	<2
Styrene	10	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	10	µg/L	<1	<1	<1	<1	<1	<1
o-xylene	10	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-trichloropropane	10	µg/L	<1	<1	<1	<1	<1	<1
Isopropylbenzene	10	µg/L	<1	<1	<1	<1	<1	<1
Bromobenzene	10	µg/L	<1	<1	<1	<1	<1	<1
n-propyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1
2-chlorotoluene	10	µg/L	<1	<1	<1	<1	<1	<1
4-chlorotoluene	10	µg/L	<1	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1
Tert-butyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1
1,3-dichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1
Sec-butyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1
1,4-dichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1
4-isopropyl toluene	10	µg/L	<1	<1	<1	<1	<1	<1
1,2-dichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1
n-butyl benzene	10	µg/L	<1	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	1	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	10	µg/L	<1	<1	<1	<1	<1	<1
TRH C6 - C9	68.4	µg/L	<10	<10	<10	<10	<10	<10
TRH C6 - C10	68.4	µg/L	<10	<10	<10	<10	<10	<10
TRH C6 - C10 lessBTEX (F1)	68.4	µg/L	<10	<10	<10	<10	<10	<10
Benzene	1	µg/L	<1	<1	<1	<1	<1	<1
Toluene	10	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	10	µg/L	<1	<1	<1	<1	<1	<1
m+p-xylene	20	µg/L	<2	<2	<2	<2	<2	<2
o-xylene	10	µg/L	<1	<1	<1	<1	<1	<1
Naphthalene	10	µg/L	<1	<1	<1	<1	<1	<1
TRH C10 - C14	132	µg/L	<50	<50	<50	<50	<50	<50
TRH C15 - C28	528	µg/L	180	130	<100	<100	<100	100
TRH C29 - C36	468	µg/L	160	<100	<100	<100	120	<100

Total +ve TRH (C10-C36)	**684**	**µg/L**	350	130	<50	<50	120	100
TRH >C10 - C16	**204**	**µg/L**	<50	<50	<50	<50	<50	<50
TRH >C10 - C16less Naphthalene (F2)	**204**	**µg/L**	<50	<50	<50	<50	<50	<50
TRH >C16 - C34	**516**	**µg/L**	300	170	<100	<100	160	150
TRH >C34 - C40	**408**	**µg/L**	<100	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	**924**	**µg/L**	300	170	<50	<50	160	150
Naphthalene	**10**	**µg/L**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	**0.72**	**µg/L**	0.3	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	**1**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	**0.48**	**µg/L**	0.4	0.2	<0.1	0.2	<0.1	<0.1
Pyrene	**10**	**µg/L**	0.6	0.2	<0.1	0.2	<0.1	<0.1
Benzo(a)anthracene	**0.36**	**µg/L**	0.3	<0.1	<0.1	0.1	<0.1	<0.1
Chrysene	**0.36**	**µg/L**	0.3	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	**0.6**	**µg/L**	0.5	<0.2	<0.2	0.2	<0.2	<0.2
Benzo(a)pyrene	**0.36**	**µg/L**	0.3	<0.1	<0.1	0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	**0.24**	**µg/L**	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	**10**	**µg/L**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	**0.36**	**µg/L**	0.3	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	**50**	**µg/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +vePAH's	**3.72**	**µg/L**	3.1	0.52	<0.1	1	<0.1	<0.1
Perfluorobutanesulfonic acid	**0.156**	**µg/L**	<0.01	<0.01		<0.01	<0.01	<0.01
Perfluoropentanesulfonic acid	**0.168**	**µg/L**	<0.01	<0.01		<0.01	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	**0.96**	**µg/L**	<0.01	<0.01		<0.01	<0.01	<0.01
Perfluoroheptanesulfonic acid	**0.048**	**µg/L**	<0.01	<0.01		<0.01	<0.01	<0.01
Perfluorooctanesulfonic acidPFOS	**1.2**	**µg/L**	0.01	<0.01		<0.01	<0.01	<0.01
Perfluorodecanesulfonic acid	**0.744**	**µg/L**	<0.02	<0.02		<0.02	<0.02	<0.02
Perfluorobutanoic acid	**0.036**	**µg/L**	<0.02	<0.02		<0.02	<0.02	<0.02
Perfluoropentanoic acid	**0.048**	**µg/L**	<0.02	<0.02		<0.02	<0.02	<0.02
Perfluorohexanoic acid	**0.216**	**µg/L**	<0.01	<0.01		<0.01	<0.01	<0.01
Perfluoroheptanoic acid	**0.036**	**µg/L**	<0.01	<0.01		<0.01	<0.01	<0.01
Perfluorooctanoic acid PFOA	**0.072**	**µg/L**	<0.01	<0.01		<0.01	<0.01	<0.01
Perfluorononanoic acid	**0.1**	**µg/L**	<0.01	<0.01		<0.01	<0.01	<0.01
Perfluorodecanoic acid	**0.2**	**µg/L**	<0.02	<0.02		<0.02	<0.02	<0.02
Perfluoroundecanoic acid	**0.2**	**µg/L**	<0.02	<0.02		<0.02	<0.02	<0.02
Perfluorododecanoic acid	**0.5**	**µg/L**	<0.05	<0.05		<0.05	<0.05	<0.05
Perfluorotridecanoic acid	**1**	**µg/L**	<0.1	<0.1		<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	**5**	**µg/L**	<0.5	<0.5		<0.5	<0.5	<0.5
4:2 FTS	**0.1**	**µg/L**	<0.01	<0.01		<0.01	<0.01	<0.01
6:2 FTS	**0.744**	**µg/L**	0.01	<0.01		0.02	<0.01	<0.01
8:2 FTS	**0.2**	**µg/L**	<0.02	<0.02		<0.02	<0.02	<0.02
10:2 FTS	**0.2**	**µg/L**	<0.02	<0.02		<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	**1**	**µg/L**	<0.1	<0.1		<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	**0.5**	**µg/L**	<0.05	<0.05		<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfonamide	**1**	**µg/L**	<0.1	<0.1		<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamidoethanol	**0.5**	**µg/L**	<0.05	<0.05		<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamidoethanol	**5**	**µg/L**	<0.5	<0.5		<0.5	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	**0.2**	**µg/L**	<0.02	<0.02		<0.02	<0.02	<0.02
EtPerfluorooctanesulf-amid oacetic acid	**0.2**	**µg/L**	<0.02	<0.02		<0.02	<0.02	<0.02
Total Positive PFHxS & PFOS	**2.16**	**µg/L**	0.01	<0.01		<0.01	<0.01	<0.01
Total Positive PFOA & PFOS	**1.32**	**µg/L**	0.01	<0.01		<0.01	<0.01	<0.01
Total Positive PFAS	**2.88**	**µg/L**	0.02	<0.01		0.02	<0.01	<0.01
Arsenic-Dissolved	**96**	**µg/L**	3	<1	<1	1	1	<1
Boron-Dissolved	**5160**	**µg/L**	100	1500	680	3900	100	<20
Barium-Dissolved	**432**	**µg/L**	37	45	95	42	36	16
Beryllium-Dissolved	**1.2**	**µg/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium-Dissolved	**0.48**	**µg/L**	<0.1	<0.1	<0.1	0.1	0.1	<0.1
Chromium-Dissolved	**44.4**	**µg/L**	<1	<1	<1	<1	<1	<1
Copper-Dissolved	**1032**	**µg/L**	<1	<1	5	7	<1	6
Cobalt-Dissolved	**31.2**	**µg/L**	<1	<1	<1	<1	26	<1
Mercury-Dissolved	**0.24**	**µg/L**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Dissolved	**1320**	**µg/L**	56	54	41	7	420	<5
Molybdenum-Dissolved	**40.8**	**µg/L**	9	18	26	11	<1	1
Nickel-Dissolved	**444**	**µg/L**	<1	<1	5	2	28	2
Lead-Dissolved	**180**	**µg/L**	<1	<1	<1	<1	2	<1
Antimony-Dissolved	**4.8**	**µg/L**	3	2	2	<1	<1	<1
Selenium-Dissolved	**1.2**	**µg/L**	<1	<1	<1	<1	<1	<1
Tin-Dissolved	**2.4**	**µg/L**	<1	<1	<1	<1	<1	<1
Zinc-Dissolved	**344.4**	**µg/L**	3	<1	2	28	160	13
Iron-Dissolved	**396000**	**µg/L**	<10	20	<10	<10	15000	<10
Arsenic-Total	**504**	**µg/L**	30	19	35	6	420	<1
Boron-Total	**5160**	**µg/L**	100	1600	1000	4000	200	<20
Barium-Total	**15600**	**µg/L**	740	920	330	67	13000	94
Beryllium-Total	**66**	**µg/L**	5	7	1	<0.5	55	<0.5
Cadmium-Total	**32.4**	**µg/L**	1	1.6	0.2	0.1	27	<0.1
Chromium-Total	**492**	**µg/L**	110	140	34	11	410	25
Copper-Total	**1140**	**µg/L**	280	340	71	59	720	15
Cobalt-Total	**684**	**µg/L**	35	48	7	2	570	1
Mercury-Total	**1.044**	**µg/L**	0.5	0.4	0.2	0.2	<0.05	<0.05
Manganese-Total	**9960**	**µg/L**	1300	1800	220	130	8300	48
Molybdenum-Total	**105.6**	**µg/L**	9	21	26	12	88	<1
Nickel-Total	**612**	**µg/L**	70	90	16	6	510	2
Lead-Total	**21600**	**µg/L**	260	270	52	39	18000	15
Antimony-Total	**9.6**	**µg/L**	7	6	4	1	2	4
Selenium-Total	**3.6**	**µg/L**	1	2	2	<1	3	<1
Tin-Total	**26.4**	**µg/L**	10	16	5	3	3	<1
Zinc-Total	**6000**	**µg/L**	1700	1900	170	97	5000	84
Iron-Total	**648000**	**µg/L**	83000	100000	100000	7500	540000	1700

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CERTIFICATE OF ANALYSIS 317294

Client Details

Client	CTP AFJV
Attention	[redacted]
Address	7 Figtree Dr, SYDNEY OLYMPIC PARK, NSW, 2127

Sample Details

Your Reference	**CTP Groundwater Monitoring**
Number of Samples	1 Water
Date samples received	24/02/2023
Date completed instructions received	24/02/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	03/03/2023
Date of Issue	02/03/2023

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Results Approved By
Diego Bigolin, Inorganics Supervisor
Kyle Gavrily, Senior Chemist
Loren Bardwell, Development Chemist
Phalak Inthakesone, Organics Development Manager, Sydney
Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date extracted	-	27/02/2023
Date analysed	-	27/02/2023
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	<1
Bromochloromethane	µg/L	<1
Chloroform	µg/L	<1
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Cyclohexane	µg/L	<1
Carbon tetrachloride	µg/L	<1
Benzene	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	<1
Bromodichloromethane	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
Toluene	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1

VOCs in water		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Ethylbenzene	µg/L	<1
Bromoform	µg/L	<1
m+p-xylene	µg/L	<2
Styrene	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
o-xylene	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Isopropylbenzene	µg/L	<1
Bromobenzene	µg/L	<1
n-propyl benzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3,5-trimethyl benzene	µg/L	<1
Tert-butyl benzene	µg/L	<1
1,2,4-trimethyl benzene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
Sec-butyl benzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
4-isopropyl toluene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
n-butyl benzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	111
Surrogate toluene-d8	%	101
Surrogate 4-BFB	%	106

vTRH(C6-C10)/BTEXN in Water		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date extracted	-	27/02/2023
Date analysed	-	27/02/2023
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	111
Surrogate toluene-d8	%	101
Surrogate 4-BFB	%	106

svTRH (C10-C40) in Water		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date extracted	-	27/02/2023
Date analysed	-	27/02/2023
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	72

PAHs in Water		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date extracted	-	27/02/2023
Date analysed	-	28/02/2023
Naphthalene	µg/L	<0.2
Acenaphthylene	µg/L	<0.1
Acenaphthene	µg/L	<0.1
Fluorene	µg/L	<0.1
Phenanthrene	µg/L	<0.1
Anthracene	µg/L	<0.1
Fluoranthene	µg/L	<0.1
Pyrene	µg/L	<0.1
Benzo(a)anthracene	µg/L	<0.1
Chrysene	µg/L	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2
Benzo(a)pyrene	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5
Total +ve PAH's	µg/L	<0.1
Surrogate p-Terphenyl-d14	%	75

All metals in water-dissolved		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date prepared	-	27/02/2023
Date analysed	-	27/02/2023
Arsenic-Dissolved	µg/L	<1
Boron-Dissolved	µg/L	30
Barium-Dissolved	µg/L	12
Beryllium-Dissolved	µg/L	<0.5
Cadmium-Dissolved	µg/L	0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	7
Cobalt-Dissolved	µg/L	39
Mercury-Dissolved	µg/L	<0.05
Manganese-Dissolved	µg/L	17,000
Molybdenum-Dissolved	µg/L	1
Nickel-Dissolved	µg/L	31
Lead-Dissolved	µg/L	<1
Antimony-Dissolved	µg/L	<1
Selenium-Dissolved	µg/L	<1
Tin-Dissolved	µg/L	<1
Zinc-Dissolved	µg/L	200
Iron-Dissolved	µg/L	30

All metals in water - total		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date prepared	-	28/02/2023
Date analysed	-	28/02/2023
Arsenic-Total	µg/L	1
Boron-Total	µg/L	40
Barium-Total	µg/L	26
Beryllium-Total	µg/L	<0.5
Cadmium-Total	µg/L	0.3
Chromium-Total	µg/L	4
Copper-Total	µg/L	34
Cobalt-Total	µg/L	60
Mercury-Total	µg/L	<0.05
Manganese-Total	µg/L	21,000
Molybdenum-Total	µg/L	2
Nickel-Total	µg/L	47
Lead-Total	µg/L	9
Antimony-Total	µg/L	1
Selenium-Total	µg/L	<1
Tin-Total	µg/L	<1
Zinc-Total	µg/L	340
Iron-Total	µg/L	880

Metals in Waters - Total		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date prepared	-	28/02/2023
Date analysed	-	28/02/2023
Phosphorus - Total	mg/L	0.2

Miscellaneous Inorganics		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date prepared	-	24/02/2023
Date analysed	-	24/02/2023
Ammonia as N in water	mg/L	0.10
Nitrate as N in water	mg/L	0.28
Total Nitrogen in water	mg/L	0.5

Ion Balance		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date prepared	-	24/02/2023
Date analysed	-	24/02/2023
Calcium - Dissolved	mg/L	13
Potassium - Dissolved	mg/L	8.0
Sodium - Dissolved	mg/L	350
Magnesium - Dissolved	mg/L	22
Hardness	mgCaCO 3 /L	120
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	70
Carbonate Alkalinity as $CaCO_3$	mg/L	<5
Total Alkalinity as $CaCO_3$	mg/L	70
Sulphate, SO4	mg/L	140
Chloride, Cl	mg/L	550
Ionic Balance	%	-5.0

PFAS in Waters Extended		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Date prepared	-	27/02/2023
Date analysed	-	27/02/2023
Perfluorobutanesulfonic acid	µg/L	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02
Perfluorobutanoic acid	µg/L	<0.02
Perfluoropentanoic acid	µg/L	<0.02
Perfluorohexanoic acid	µg/L	<0.01
Perfluoroheptanoic acid	µg/L	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01
Perfluorononanoic acid	µg/L	<0.01
Perfluorodecanoic acid	µg/L	<0.02
Perfluoroundecanoic acid	µg/L	<0.02
Perfluorododecanoic acid	µg/L	<0.05
Perfluorotridecanoic acid	µg/L	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5
4:2 FTS	µg/L	<0.01
6:2 FTS	µg/L	<0.01
8:2 FTS	µg/L	<0.02
10:2 FTS	µg/L	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	95
Surrogate $^{13}C_2$ *PFOA*	%	110
Extracted ISTD $^{13}C_3$ *PFBS*	%	106
Extracted ISTD $^{18}O_2$ *PFHxS*	%	105
Extracted ISTD $^{13}C_4$ *PFOS*	%	109

PFAS in Waters Extended		
Our Reference		317294-1
Your Reference	UNITS	SHWBH051
Depth		10.68
Date Sampled		22/02/2023
Type of sample		Water
Extracted ISTD $^{13}C_4$ *PFBA*	%	90
Extracted ISTD $^{13}C_3$ *PFPeA*	%	106
Extracted ISTD $^{13}C_2$ *PFHxA*	%	105
Extracted ISTD $^{13}C_4$ *PFHpA*	%	99
Extracted ISTD $^{13}C_4$ *PFOA*	%	103
Extracted ISTD $^{13}C_5$ *PFNA*	%	116
Extracted ISTD $^{13}C_2$ *PFDA*	%	106
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	108
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	104
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	71
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	100
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	99
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	108
Extracted ISTD $^{13}C_8$ *FOSA*	%	94
Extracted ISTD d_3 *N MeFOSA*	%	98
Extracted ISTD d_5 *N EtFOSA*	%	101
Extracted ISTD d_7 *N MeFOSE*	%	106
Extracted ISTD d_9 *N EtFOSE*	%	123
Extracted ISTD d_3 *N MeFOSAA*	%	101
Extracted ISTD d_5 *N EtFOSAA*	%	103
Total Positive PFHxS & PFOS	µg/L	<0.01
Total Positive PFOA & PFOS	µg/L	<0.01
Total Positive PFAS	µg/L	<0.01

Method ID	Methodology Summary
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			27/02/2023	[NT]	[NT]	[NT]	[NT]	27/02/2023	[NT]
Date analysed	-			27/02/2023	[NT]	[NT]	[NT]	[NT]	27/02/2023	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	110	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate toluene-d8	%		Org-023	104	[NT]	[NT]	[NT]	[NT]	97	[NT]
Surrogate 4-BFB	%		Org-023	105	[NT]	[NT]	[NT]	[NT]	106	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			27/02/2023	[NT]	[NT]	[NT]	[NT]	27/02/2023	[NT]
Date analysed	-			27/02/2023	[NT]	[NT]	[NT]	[NT]	27/02/2023	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	97	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	97	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	99	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	110	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate toluene-d8	%		Org-023	104	[NT]	[NT]	[NT]	[NT]	97	[NT]
Surrogate 4-BFB	%		Org-023	105	[NT]	[NT]	[NT]	[NT]	106	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			27/02/2023	1	27/02/2023	27/02/2023		27/02/2023	[NT]
Date analysed	-			27/02/2023	1	27/02/2023	27/02/2023		27/02/2023	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	<50	<50	0	68	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	<100	0	98	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	71	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	<50	<50	0	68	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	<100	0	98	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	71	[NT]
Surrogate o-Terphenyl	%		Org-020	77	1	72	79	9	87	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			27/02/2023	1	27/02/2023	27/02/2023		27/02/2023	[NT]
Date analysed	-			28/02/2023	1	28/02/2023	28/02/2023		28/02/2023	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	71	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	75	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	78	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	83	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	67	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	97	1	75	81	8	94	[NT]

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/02/2023	[NT]	[NT]	[NT]	[NT]	27/02/2023	[NT]
Date analysed	-			27/02/2023	[NT]	[NT]	[NT]	[NT]	27/02/2023	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Boron-Dissolved	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	82	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	85	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	115	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	90	[NT]
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Antimony-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Tin-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			28/02/2023	[NT]	[NT]	[NT]	[NT]	28/02/2023	[NT]
Date analysed	-			28/02/2023	[NT]	[NT]	[NT]	[NT]	28/02/2023	[NT]
Arsenic-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Boron-Total	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	109	[NT]
Barium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	99	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Chromium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Copper-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Cobalt-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Mercury-Total	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	115	[NT]
Manganese-Total	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	88	[NT]
Molybdenum-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Lead-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Antimony-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Selenium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Tin-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Zinc-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Iron-Total	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: Metals in Waters - Total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			28/02/2023	[NT]	[NT]	[NT]	[NT]	28/02/2023	[NT]
Date analysed	-			28/02/2023	[NT]	[NT]	[NT]	[NT]	28/02/2023	[NT]
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			24/02/2023	[NT]	[NT]	[NT]	[NT]	24/02/2023	[NT]
Date analysed	-			24/02/2023	[NT]	[NT]	[NT]	[NT]	24/02/2023	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	[NT]	[NT]	105	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	[NT]	[NT]	110	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: Ion Balance					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			24/02/2023	[NT]	[NT]	[NT]	[NT]	24/02/2023	[NT]
Date analysed	-			24/02/2023	[NT]	[NT]	[NT]	[NT]	24/02/2023	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	94	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	88	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	99	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	92	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	100	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/02/2023	[NT]	[NT]	[NT]	[NT]	27/02/2023	[NT]
Date analysed	-			27/02/2023	[NT]	[NT]	[NT]	[NT]	27/02/2023	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	116	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	113	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	114	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	113	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	118	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	116	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	116	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	116	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	117	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	117	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	112	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	115	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	117	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	119	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	117	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	111	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	116	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	112	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	129	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	121	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	122	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	117	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	118	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	109	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	117	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	116	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	101	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	101	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	97	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	96	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	96	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	93	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	101	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	110	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	105	[NT]	[NT]	[NT]	[NT]	97	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	95	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	78	[NT]	[NT]	[NT]	[NT]	58	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	95	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	114	[NT]	[NT]	[NT]	[NT]	102	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	118	[NT]	[NT]	[NT]	[NT]	113	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	91	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	91	[NT]	[NT]	[NT]	[NT]	91	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	117	[NT]	[NT]	[NT]	[NT]	103	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	111	[NT]	[NT]	[NT]	[NT]	105	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

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CERTIFICATE OF ANALYSIS 319138

Client Details

Client	CTP AFJV
Attention	[redacted]
Address	7 Figtree Dr, SYDNEY OLYMPIC PARK, NSW, 2127

Sample Details

Your Reference	**CTP Groundwater Monitoring**
Number of Samples	4 Water
Date samples received	21/03/2023
Date completed instructions received	21/03/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	28/03/2023
Date of Issue	28/03/2023

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Results Approved By
Alexander Mitchell Maclean, Senior Chemist
Diego Bigolin, Inorganics Supervisor
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Kyle Gavrily, Senior Chemist
Loren Bardwell, Development Chemist

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	28/03/2023	28/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1

VOCs in water					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Bromoform	µg/L	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	105	104	104	105
Surrogate toluene-d8	%	101	101	100	99
Surrogate 4-BFB	%	99	99	101	102

vTRH(C6-C10)/BTEXN in Water					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	28/03/2023	28/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023
TRH C_6 - C_9	µg/L	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	105	104	104	105
Surrogate toluene-d8	%	101	101	100	99
Surrogate 4-BFB	%	99	99	101	102

svTRH (C10-C40) in Water					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date extracted	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	25/03/2023	25/03/2023	25/03/2023	25/03/2023
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	130	180	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	160	<100	<100
Total +ve TRH (C10-C36)	µg/L	130	350	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	170	300	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	170	300	<50	<50
Surrogate o-Terphenyl	%	71	70	81	77

PAHs in Water					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date extracted	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	0.3	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.2	0.4	<0.1	0.2
Pyrene	µg/L	0.2	0.6	<0.1	0.2
Benzo(a)anthracene	µg/L	<0.1	0.3	<0.1	0.1
Chrysene	µg/L	<0.1	0.3	<0.1	0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	0.5	<0.2	0.2
Benzo(a)pyrene	µg/L	<0.1	0.3	<0.1	0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	0.2	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	0.3	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.52	3.1	<0.1	1.0
Surrogate p-Terphenyl-d14	%	91	90	100	94

All metals in water-dissolved					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date prepared	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Date analysed	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Arsenic-Dissolved	µg/L	<1	3	<1	1
Boron-Dissolved	µg/L	1,500	100	680	3,900
Barium-Dissolved	µg/L	45	37	95	42
Beryllium-Dissolved	µg/L	<0.5	<0.5	<0.5	<0.5
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1
Copper-Dissolved	µg/L	<1	<1	5	7
Cobalt-Dissolved	µg/L	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05
Manganese-Dissolved	µg/L	54	56	41	7
Molybdenum-Dissolved	µg/L	18	9	26	11
Nickel-Dissolved	µg/L	<1	<1	5	2
Lead-Dissolved	µg/L	<1	<1	<1	<1
Antimony-Dissolved	µg/L	2	3	2	<1
Selenium-Dissolved	µg/L	<1	<1	<1	<1
Tin-Dissolved	µg/L	<1	<1	<1	<1
Zinc-Dissolved	µg/L	<1	3	2	28
Iron-Dissolved	µg/L	20	<10	<10	<10

All metals in water - total					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date prepared	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Date analysed	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Arsenic-Total	µg/L	19	30	35	6
Boron-Total	µg/L	1,600	100	1,000	4,000
Barium-Total	µg/L	920	740	330	67
Beryllium-Total	µg/L	7	5	1	<0.5
Cadmium-Total	µg/L	1.6	1.0	0.2	0.1
Chromium-Total	µg/L	140	110	34	11
Copper-Total	µg/L	340	280	71	59
Cobalt-Total	µg/L	48	35	7	2
Mercury-Total	µg/L	0.4	0.5	0.2	0.2
Manganese-Total	µg/L	1,800	1,300	220	130
Molybdenum-Total	µg/L	21	9	26	12
Nickel-Total	µg/L	90	70	16	6
Lead-Total	µg/L	270	260	52	39
Antimony-Total	µg/L	6	7	4	1
Selenium-Total	µg/L	2	1	2	<1
Tin-Total	µg/L	16	10	5	3
Zinc-Total	µg/L	1,900	1,700	170	97
Iron-Total	µg/L	100,000	83,000	100,000	7,500

Metals in Waters - Total					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date prepared	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Date analysed	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Phosphorus - Total	mg/L	3.1	3.4	0.64	0.5

Miscellaneous Inorganics					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date prepared	-	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Date analysed	-	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Ammonia as N in water	mg/L	0.48	0.52	1.3	0.11
Nitrate as N in water	mg/L	<0.005	0.057	1.0	0.17
Total Nitrogen in water	mg/L	0.8	1.0	1.5	0.4
Hexavalent Chromium, Cr^{6+}	mg/L	<0.005	<0.005	<0.005	<0.005
Trivalent Chromium, Cr^{3+}	mg/L	0.14	0.11	0.034	0.011

Ion Balance					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date prepared	-	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Date analysed	-	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Calcium - Dissolved	mg/L	27	56	36	420
Potassium - Dissolved	mg/L	24	15	35	370
Sodium - Dissolved	mg/L	360	29	110	9,300
Magnesium - Dissolved	mg/L	13	3	22	1,300
Hardness	mgCaCO 3 /L	120	150	180	6,400
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	<5	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	750	810	630	150
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	<5	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	750	810	630	150
Sulphate, SO4	mg/L	150	24	22	2,500
Chloride, Cl	mg/L	570	32	160	17,000
Ionic Balance	%	-30	-58	-31	-1.0

PFAS in Waters Extended					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Date prepared	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Date analysed	-	22/03/2023	22/03/2023	22/03/2023	23/03/2023
Perfluorobutanesulfonic acid	µg/L	<0.01	<0.01	0.1	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01	<0.01	0.12	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01	<0.01	0.79	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01	<0.01	0.03	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01	0.01	0.60	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid	µg/L	<0.02	<0.02	0.02	<0.02
Perfluoropentanoic acid	µg/L	<0.02	<0.02	0.03	<0.02
Perfluorohexanoic acid	µg/L	<0.01	<0.01	0.14	<0.01
Perfluoroheptanoic acid	µg/L	<0.01	<0.01	0.02	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01	<0.01	0.04	<0.01
Perfluorononanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01
Perfluorodecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid	µg/L	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid	µg/L	<0.1	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5	<0.5	<0.5	<0.5
4:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01
6:2 FTS	µg/L	<0.01	0.01	<0.01	0.02
8:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02
10:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	98	100	99	95
Surrogate $^{13}C_2$ *PFOA*	%	112	109	107	76
Extracted ISTD $^{13}C_3$ *PFBS*	%	101	98	101	81
Extracted ISTD $^{18}O_2$ *PFHxS*	%	93	92	85	70
Extracted ISTD $^{13}C_4$ *PFOS*	%	103	101	89	105
Extracted ISTD $^{13}C_4$ *PFBA*	%	88	91	78	60

PFAS in Waters Extended					
Our Reference		319138-1	319138-2	319138-3	319138-4
Your Reference	UNITS	S02d	S02s	S06	S55
Date Sampled		20/03/2023	20/03/2023	20/03/2023	20/03/2023
Type of sample		Water	Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	103	101	100	52
Extracted ISTD $^{13}C_2$ *PFHxA*	%	100	100	100	76
Extracted ISTD $^{13}C_4$ *PFHpA*	%	100	102	95	87
Extracted ISTD $^{13}C_4$ *PFOA*	%	101	104	98	93
Extracted ISTD $^{13}C_5$ *PFNA*	%	103	105	88	89
Extracted ISTD $^{13}C_2$ *PFDA*	%	100	95	79	89
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	122	112	72	100
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	129	122	61	113
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	144	127	35	72
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	104	114	108	35
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	110	116	105	37
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	121	121	84	55
Extracted ISTD $^{13}C_8$ *FOSA*	%	101	105	90	95
Extracted ISTD d_3 *N MeFOSA*	%	103	106	99	100
Extracted ISTD d_5 *N EtFOSA*	%	105	105	96	116
Extracted ISTD d_7 *N MeFOSE*	%	100	94	87	91
Extracted ISTD d_9 *N EtFOSE*	%	102	97	82	112
Extracted ISTD d_3 *N MeFOSAA*	%	116	114	87	72
Extracted ISTD d_5 *N EtFOSAA*	%	113	115	79	57
Total Positive PFHxS & PFOS	µg/L	<0.01	0.01	1.4	<0.01
Total Positive PFOA & PFOS	µg/L	<0.01	0.01	0.63	<0.01
Total Positive PFAS	µg/L	<0.01	0.02	1.9	0.02

Method ID	Methodology Summary
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-024	Hexavalent Chromium (Cr6+) - determined colourimetrically. Waters samples are filtered on receipt prior to analysis.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Date analysed	-			28/03/2023	[NT]	[NT]	[NT]	[NT]	28/03/2023	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	81	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	102	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate 4-BFB	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Date analysed	-			28/03/2023	[NT]	[NT]	[NT]	[NT]	28/03/2023	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	85	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	85	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	86	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	102	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate 4-BFB	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	319138-4
Date extracted	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	24/03/2023
Date analysed	-			25/03/2023	1	25/03/2023	25/03/2023		25/03/2023	25/03/2023
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	<50	<50	0	93	80
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	130	150	14	101	91
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	86	101
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	<50	<50	0	93	80
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	170	200	16	101	91
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	86	101
Surrogate o-Terphenyl	%		Org-020	83	1	71	74	4	75	67

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	[NT]
Date analysed	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	83	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	136	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	0.1	0.2	67	127	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	0.2	0.2	0	101	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	0.2	0.2	0	105	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	89	1	91	90	1	103	[NT]

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			22/03/2023	[NT]	[NT]	[NT]	[NT]	22/03/2023	[NT]
Date analysed	-			22/03/2023	[NT]	[NT]	[NT]	[NT]	22/03/2023	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Boron-Dissolved	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	93	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	95	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	112	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	96	[NT]
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Antimony-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Tin-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W7	319138-2
Date prepared	-			22/03/2023	1	22/03/2023	22/03/2023		22/03/2023	22/03/2023
Date analysed	-			22/03/2023	1	22/03/2023	22/03/2023		22/03/2023	22/03/2023
Arsenic-Total	µg/L	1	Metals-022	<1	1	19	[NT]		94	[NT]
Boron-Total	µg/L	20	Metals-022	<20	1	1600	[NT]		93	[NT]
Barium-Total	µg/L	1	Metals-022	<1	1	920	[NT]		96	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	<0.5	1	7	[NT]		93	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	1	1.6	[NT]		97	[NT]
Chromium-Total	µg/L	1	Metals-022	<1	1	140	[NT]		99	[NT]
Copper-Total	µg/L	1	Metals-022	<1	1	340	[NT]		96	[NT]
Cobalt-Total	µg/L	1	Metals-022	<1	1	48	[NT]		95	[NT]
Mercury-Total	µg/L	0.05	Metals-021	<0.05	1	0.4	0.3	29	102	78
Manganese-Total	µg/L	5	Metals-022	<5	1	1800	[NT]		99	[NT]
Molybdenum-Total	µg/L	1	Metals-022	<1	1	21	[NT]		94	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	1	90	[NT]		96	[NT]
Lead-Total	µg/L	1	Metals-022	<1	1	270	[NT]		97	[NT]
Antimony-Total	µg/L	1	Metals-022	<1	1	6	[NT]		102	[NT]
Selenium-Total	µg/L	1	Metals-022	<1	1	2	[NT]		93	[NT]
Tin-Total	µg/L	1	Metals-022	<1	1	16	[NT]		98	[NT]
Zinc-Total	µg/L	1	Metals-022	<1	1	1900	[NT]		97	[NT]
Iron-Total	µg/L	10	Metals-022	<10	1	100000	[NT]		100	[NT]

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	3	22/03/2023	22/03/2023		[NT]	[NT]
Date analysed	-			[NT]	3	22/03/2023	22/03/2023		[NT]	[NT]
Arsenic-Total	µg/L	1	Metals-022	[NT]	3	35	36	3	[NT]	[NT]
Boron-Total	µg/L	20	Metals-022	[NT]	3	1000	980	2	[NT]	[NT]
Barium-Total	µg/L	1	Metals-022	[NT]	3	330	320	3	[NT]	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	[NT]	3	1	1	0	[NT]	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	[NT]	3	0.2	0.2	0	[NT]	[NT]
Chromium-Total	µg/L	1	Metals-022	[NT]	3	34	35	3	[NT]	[NT]
Copper-Total	µg/L	1	Metals-022	[NT]	3	71	74	4	[NT]	[NT]
Cobalt-Total	µg/L	1	Metals-022	[NT]	3	7	7	0	[NT]	[NT]
Mercury-Total	µg/L	0.05	Metals-021	[NT]	3	0.2	[NT]		[NT]	[NT]
Manganese-Total	µg/L	5	Metals-022	[NT]	3	220	230	4	[NT]	[NT]
Molybdenum-Total	µg/L	1	Metals-022	[NT]	3	26	26	0	[NT]	[NT]
Nickel-Total	µg/L	1	Metals-022	[NT]	3	16	17	6	[NT]	[NT]
Lead-Total	µg/L	1	Metals-022	[NT]	3	52	49	6	[NT]	[NT]
Antimony-Total	µg/L	1	Metals-022	[NT]	3	4	4	0	[NT]	[NT]
Selenium-Total	µg/L	1	Metals-022	[NT]	3	2	2	0	[NT]	[NT]
Tin-Total	µg/L	1	Metals-022	[NT]	3	5	3	50	[NT]	[NT]
Zinc-Total	µg/L	1	Metals-022	[NT]	3	170	180	6	[NT]	[NT]
Iron-Total	µg/L	10	Metals-022	[NT]	3	100000	100000	0	[NT]	[NT]

QUALITY CONTROL: Metals in Waters - Total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			22/03/2023	3	22/03/2023	22/03/2023		22/03/2023	[NT]
Date analysed	-			22/03/2023	3	22/03/2023	22/03/2023		22/03/2023	[NT]
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	3	0.64	0.63	2	114	[NT]

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			21/03/2023	[NT]	[NT]	[NT]	[NT]	21/03/2023	[NT]
Date analysed	-			21/03/2023	[NT]	[NT]	[NT]	[NT]	21/03/2023	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	[NT]	[NT]	103	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	[NT]	[NT]	114	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Hexavalent Chromium, Cr^{6+}	mg/L	0.005	Inorg-024	<0.005	[NT]	[NT]	[NT]	[NT]	105	[NT]
Trivalent Chromium, Cr^{3+}	mg/L	0.005	Inorg-024	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: Ion Balance					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			21/03/2023	[NT]	[NT]	[NT]	[NT]	21/03/2023	[NT]
Date analysed	-			21/03/2023	[NT]	[NT]	[NT]	[NT]	21/03/2023	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	113	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	93	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	86	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	112	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	94	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319138-2
Date prepared	-			22/03/2023	1	22/03/2023	22/03/2023		22/03/2023	22/03/2023
Date analysed	-			22/03/2023	1	22/03/2023	22/03/2023		22/03/2023	22/03/2023
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	106	96
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	109	108
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	122	119
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	103	110
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	104	101
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	88	83
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	102	88
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	127	103
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	109	100
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	86	78
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	108	98
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	118	110
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	102	110
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	98	96
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	109	111
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	83	91
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	120	106
4:2 FTS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	105	102
6:2 FTS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	104	90
8:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	111	96
10:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	91	81
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	108	99
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	103	98
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	86	78
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	133	144
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	127	132
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	82	77
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	114	103
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	103	1	98	103	5	100	104
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	92	1	112	104	7	102	104

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319138-2
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	89	1	101	101	0	94	99
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	90	1	93	93	0	99	91
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	95	1	103	98	5	102	98
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	97	1	88	88	0	95	91
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	78	1	103	101	2	88	103
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	106	1	100	98	2	100	100
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	113	1	100	100	0	105	100
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	112	1	101	102	1	101	101
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	100	1	103	101	2	104	101
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	102	1	100	89	12	102	97
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	95	1	122	102	18	113	121
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	92	1	129	102	23	104	119
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	63	1	144	87	49	90	125
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	128	1	104	105	1	106	110
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	115	1	110	112	2	107	113
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	115	1	121	112	8	113	116
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	91	1	101	98	3	95	101
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	110	1	103	102	1	106	103
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	111	1	105	102	3	100	105
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	103	1	100	95	5	96	91

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319138-2
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	121	1	102	102	0	110	96
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	137	1	116	111	4	113	103
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	115	1	113	104	8	109	108

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

Matrix spike recovery for MeFOSE is outside global acceptance criteria (60-140%). However an acceptable recovery has been obtained for the LCS.

The mass inbalance may be caused by other ions that have not been measured.

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CERTIFICATE OF ANALYSIS 319210

Client Details

Client	CTP AFJV
Attention	[redacted]
Address	7 Figtree Dr, SYDNEY OLYMPIC PARK, NSW, 2127

Sample Details

Your Reference	**CTP Groundwater Monitoring**
Number of Samples	10 Water
Date samples received	21/03/2023
Date completed instructions received	23/03/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	29/03/2023
Date of Issue	29/03/2023

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Results Approved By
Ashley Miller, Development Chemist
Diego Bigolin, Inorganics Supervisor
Giovanni Agosti, Group Technical Manager
Hannah Nguyen, Metals Supervisor
Kyle Gavrily, Senior Chemist
Liam Timmins, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Dichlorodifluoromethane	µg/L	<100	<10	<10	<10	<10
Chloromethane	µg/L	<100	<10	<10	<10	<10
Vinyl Chloride	µg/L	<100	<10	<10	<10	<10
Bromomethane	µg/L	<100	<10	<10	<10	<10
Chloroethane	µg/L	<100	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<100	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<10	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<10	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<10	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<10	<1	<1	<1	<1
Bromochloromethane	µg/L	<10	<1	<1	<1	<1
Chloroform	µg/L	<10	<1	2	<1	<1
2,2-dichloropropane	µg/L	<10	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<10	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<10	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<10	<1	<1	<1	<1
Cyclohexane	µg/L	<10	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<10	<1	<1	<1	<1
Benzene	µg/L	44	<1	<1	<1	<1
Dibromomethane	µg/L	<10	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<10	<1	<1	<1	<1
Trichloroethene	µg/L	<10	<1	<1	<1	<1
Bromodichloromethane	µg/L	<10	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<10	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<10	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<10	<1	<1	<1	<1
Toluene	µg/L	<10	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<10	<1	<1	<1	<1
Dibromochloromethane	µg/L	<10	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<10	<1	<1	<1	<1
Tetrachloroethene	µg/L	<10	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<10	<1	<1	<1	<1
Chlorobenzene	µg/L	29	<1	<1	<1	<1
Ethylbenzene	µg/L	<10	<1	<1	<1	<1

VOCs in water						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Bromoform	µg/L	<10	<1	<1	<1	<1
m+p-xylene	µg/L	<20	<2	<2	<2	<2
Styrene	µg/L	<10	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<10	<1	<1	<1	<1
o-xylene	µg/L	<10	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<10	<1	<1	<1	<1
Isopropylbenzene	µg/L	<10	<1	<1	<1	<1
Bromobenzene	µg/L	<10	<1	<1	<1	<1
n-propyl benzene	µg/L	<10	<1	<1	<1	<1
2-chlorotoluene	µg/L	<10	<1	<1	<1	<1
4-chlorotoluene	µg/L	<10	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<10	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<10	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<10	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<10	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<10	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<10	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<10	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<10	<1	<1	<1	<1
n-butyl benzene	µg/L	<10	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<10	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<10	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<10	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<10	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	103	103	105	106	106
Surrogate toluene-d8	%	99	96	99	97	100
Surrogate 4-BFB	%	101	104	97	103	97

VOCs in water						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1

VOCs in water						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Bromoform	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	106	95	104	107	106
Surrogate toluene-d8	%	100	99	99	96	97
Surrogate 4-BFB	%	99	100	100	104	103

vTRH(C6-C10)/BTEXN in Water						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
TRH C_6 - C_9	µg/L	<100	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<100	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<100	<10	<10	<10	<10
Benzene	µg/L	44	<1	<1	<1	<1
Toluene	µg/L	<10	<1	<1	<1	<1
Ethylbenzene	µg/L	<10	<1	<1	<1	<1
m+p-xylene	µg/L	<10	<2	<2	<2	<2
o-xylene	µg/L	<10	<1	<1	<1	<1
Naphthalene	µg/L	12	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	103	103	105	106	106
Surrogate toluene-d8	%	99	96	99	97	100
Surrogate 4-BFB	%	101	104	97	103	97

vTRH(C6-C10)/BTEXN in Water						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	106	95	104	107	106
Surrogate toluene-d8	%	100	99	99	96	97
Surrogate 4-BFB	%	99	100	100	104	103

svTRH (C10-C40) in Water						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
TRH C_{10} - C_{14}	µg/L	520	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	1,100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	110	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	1,700	<50	<50	<50	<50
TRH >C_{10} - C_{16}	µg/L	700	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	680	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	940	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	1,600	<50	<50	<50	<50
Surrogate o-Terphenyl	%	95	76	64	76	71

svTRH (C10-C40) in Water						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	29/03/2023	28/03/2023
TRH C_{10} - C_{14}	µg/L	80	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	300	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	430	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	810	<50	<50	<50	<50
TRH >C_{10} - C_{16}	µg/L	64	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	64	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	570	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	210	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	840	<50	<50	<50	<50
Surrogate o-Terphenyl	%	70	78	88	97	82

PAHs in Water						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	29/03/2023	29/03/2023
Naphthalene	µg/L	10	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	11	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	97	100	93	86	84

PAHs in Water						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Date analysed	-	29/03/2023	29/03/2023	29/03/2023	29/03/2023	29/03/2023
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	71	89	90	91	82

All metals in water-dissolved						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Arsenic-Dissolved	µg/L	3	1	<1	<1	<1
Boron-Dissolved	µg/L	1,500	40	40	50	50
Barium-Dissolved	µg/L	950	76	130	43	52
Beryllium-Dissolved	µg/L	<0.5	<0.5	<0.5	1	2
Cadmium-Dissolved	µg/L	<0.1	<0.1	0.1	0.2	0.3
Chromium-Dissolved	µg/L	14	<1	<1	<1	<1
Copper-Dissolved	µg/L	2	5	3	3	1
Cobalt-Dissolved	µg/L	8	4	4	59	110
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Dissolved	µg/L	32	140	140	4,500	5,500
Molybdenum-Dissolved	µg/L	3	9	4	1	<1
Nickel-Dissolved	µg/L	25	10	5	34	53
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Antimony-Dissolved	µg/L	<1	<1	<1	<1	<1
Selenium-Dissolved	µg/L	<1	<1	<1	<1	<1
Tin-Dissolved	µg/L	<1	<1	<1	<1	<1
Zinc-Dissolved	µg/L	17	20	55	55	220
Iron-Dissolved	µg/L	210	20	<10	<10	<10

All metals in water-dissolved						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Arsenic-Dissolved	µg/L	<1	<1	<1	<1	<1
Boron-Dissolved	µg/L	100	<20	<20	50	90
Barium-Dissolved	µg/L	76	670	80	1,400	37
Beryllium-Dissolved	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	0.1
Chromium-Dissolved	µg/L	<1	58	9	<1	<1
Copper-Dissolved	µg/L	5	7	8	2	<1
Cobalt-Dissolved	µg/L	23	3	<1	4	29
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Dissolved	µg/L	1,800	<5	<5	150	1,600
Molybdenum-Dissolved	µg/L	2	42	5	2	<1
Nickel-Dissolved	µg/L	13	2	<1	11	15
Lead-Dissolved	µg/L	<1	1	<1	<1	<1
Antimony-Dissolved	µg/L	<1	1	2	<1	<1
Selenium-Dissolved	µg/L	<1	<1	<1	<1	<1
Tin-Dissolved	µg/L	<1	<1	<1	<1	<1
Zinc-Dissolved	µg/L	20	<1	3	10	85
Iron-Dissolved	µg/L	<10	150	<10	<10	690

All metals in water - total						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Arsenic-Total	µg/L	5	1	<1	6	<1
Boron-Total	µg/L	1,600	200	50	50	60
Barium-Total	µg/L	1,200	82	130	110	100
Beryllium-Total	µg/L	<0.5	<0.5	<0.5	1	3
Cadmium-Total	µg/L	<0.1	<0.1	0.1	0.2	0.4
Chromium-Total	µg/L	30	9	2	7	6
Copper-Total	µg/L	8	8	3	6	8
Cobalt-Total	µg/L	11	24	4	66	130
Mercury-Total	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Total	µg/L	53	990	120	4,900	6,500
Molybdenum-Total	µg/L	3	9	4	2	1
Nickel-Total	µg/L	32	25	4	41	70
Lead-Total	µg/L	8	<1	<1	4	1
Antimony-Total	µg/L	<1	<1	<1	<1	<1
Selenium-Total	µg/L	1	<1	<1	<1	<1
Tin-Total	µg/L	<1	<1	<1	<1	<1
Zinc-Total	µg/L	49	46	75	77	270
Iron-Total	µg/L	5,300	1,200	390	3,400	1,300

All metals in water - total						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Arsenic-Total	µg/L	52	<1	<1	4	10
Boron-Total	µg/L	100	<20	20	60	100
Barium-Total	µg/L	9,700	760	89	9,300	660
Beryllium-Total	µg/L	31	<0.5	<0.5	<0.5	7
Cadmium-Total	µg/L	0.8	<0.1	<0.1	<0.1	0.7
Chromium-Total	µg/L	71	65	10	18	29
Copper-Total	µg/L	680	9	17	18	150
Cobalt-Total	µg/L	280	3	<1	9	59
Mercury-Total	µg/L	0.94	<0.05	<0.05	0.06	0.07
Manganese-Total	µg/L	8,500	<5	19	230	2,300
Molybdenum-Total	µg/L	5	44	5	2	2
Nickel-Total	µg/L	120	4	5	16	58
Lead-Total	µg/L	260	2	2	15	34
Antimony-Total	µg/L	1	1	2	1	<1
Selenium-Total	µg/L	4	<1	<1	<1	<1
Tin-Total	µg/L	5	<1	<1	2	3
Zinc-Total	µg/L	880	13	36	51	660
Iron-Total	µg/L	48,000	290	380	7,100	38,000

Metals in Waters - Total						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Phosphorus - Total	mg/L	0.3	0.1	<0.05	0.1	<0.05

Metals in Waters - Total						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Phosphorus - Total	mg/L	2.3	<0.05	<0.05	0.2	0.91

Miscellaneous Inorganics						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Date analysed	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Ammonia as N in water	mg/L	210	0.65	0.14	0.095	0.060
Nitrate as N in water	mg/L	0.077	1.3	1.7	0.10	0.065
Total Nitrogen in water	mg/L	220	1.9	1.8	0.6	0.2

Miscellaneous Inorganics						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Date analysed	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Ammonia as N in water	mg/L	0.043	0.86	0.074	0.64	0.071
Nitrate as N in water	mg/L	0.04	1.1	0.53	1.4	0.02
Total Nitrogen in water	mg/L	0.4	2.5	0.7	2.6	0.2

Ion Balance						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Date analysed	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Calcium - Dissolved	mg/L	31	110	18	94	66
Potassium - Dissolved	mg/L	350	38	5.4	19	16
Sodium - Dissolved	mg/L	2,100	390	390	1,200	850
Magnesium - Dissolved	mg/L	60	14	16	130	100
Hardness	mgCaCO 3 /L	320	320	110	750	590
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	1,200	240	160	300	510
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	1,200	240	160	300	510
Sulphate, SO4	mg/L	2	55	130	350	200
Chloride, Cl	mg/L	3,400	720	470	2,100	1,300
Ionic Balance	%	-6.0	-4.0	1.0	-1.0	-1.0

Ion Balance						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Date analysed	-	22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Calcium - Dissolved	mg/L	65	220	230	160	34
Potassium - Dissolved	mg/L	5	18	3	24	4
Sodium - Dissolved	mg/L	160	220	58	1,200	340
Magnesium - Dissolved	mg/L	20	<0.5	<0.5	150	12
Hardness	mgCaCO 3 /L	250	550	580	1,000	130
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	610	230	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	280	<5	<5	500	150
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	59	62	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	280	670	290	500	150
Sulphate, SO4	mg/L	91	17	280	24	240
Chloride, Cl	mg/L	180	280	92	2,400	390
Ionic Balance	%	-1.0	-1.0	0	-2.0	-4.0

PFAS in Waters Extended						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	23/03/2023	23/03/2023	23/03/2023	23/03/2023	23/03/2023
Date analysed	-	23/03/2023	23/03/2023	23/03/2023	23/03/2023	23/03/2023
Perfluorobutanesulfonic acid	µg/L	0.22	0.02	0.05	0.02	0.03
Perfluoropentanesulfonic acid	µg/L	0.14	<0.01	<0.01	<0.01	0.02
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.39	<0.01	<0.01	<0.01	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	0.20	<0.01	<0.01	<0.01	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid	µg/L	1.8	<0.02	<0.02	0.04	0.03
Perfluoropentanoic acid	µg/L	0.41	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid	µg/L	0.63	<0.01	<0.01	<0.01	<0.01
Perfluoroheptanoic acid	µg/L	0.21	<0.01	<0.01	<0.01	<0.01
Perfluorooctanoic acid PFOA	µg/L	0.48	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid	µg/L	0.06	<0.01	<0.01	<0.01	<0.01
Perfluorodecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
6:2 FTS	µg/L	0.02	<0.01	<0.01	<0.01	<0.01
8:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
10:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.1	<0.02	<0.02	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	99	101	98	99	99
Surrogate $^{13}C_2$ *PFOA*	%	66	73	78	79	77
Extracted ISTD $^{13}C_3$ *PFBS*	%	64	72	78	77	78
Extracted ISTD $^{18}O_2$ *PFHxS*	%	66	76	80	77	77
Extracted ISTD $^{13}C_4$ *PFOS*	%	99	104	105	103	102
Extracted ISTD $^{13}C_4$ *PFBA*	%	52	54	83	64	65

PFAS in Waters Extended						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	29	64	72	68	68
Extracted ISTD $^{13}C_2$ *PFHxA*	%	62	99	96	93	93
Extracted ISTD $^{13}C_4$ *PFHpA*	%	94	111	105	97	96
Extracted ISTD $^{13}C_4$ *PFOA*	%	100	108	104	100	101
Extracted ISTD $^{13}C_5$ *PFNA*	%	92	101	100	97	97
Extracted ISTD $^{13}C_2$ *PFDA*	%	59	110	107	100	100
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	131	124	134	108	111
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	129	131	125	121	119
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	79	86	76	75	80
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	137	114	102	72	69
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	103	99	92	64	74
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	153	116	127	85	96
Extracted ISTD $^{13}C_8$ *FOSA*	%	74	99	103	102	100
Extracted ISTD d_3 *N MeFOSA*	%	106	113	113	105	107
Extracted ISTD d_5 *N EtFOSA*	%	125	128	121	119	121
Extracted ISTD d_7 *N MeFOSE*	%	89	104	107	99	101
Extracted ISTD d_9 *N EtFOSE*	%	118	120	119	118	119
Extracted ISTD d_3 *N MeFOSAA*	%	150	136	140	106	111
Extracted ISTD d_5 *N EtFOSAA*	%	96	96	139	87	88
Total Positive PFHxS & PFOS	µg/L	0.59	<0.01	<0.01	<0.01	<0.01
Total Positive PFOA & PFOS	µg/L	0.68	<0.01	<0.01	<0.01	<0.01
Total Positive PFAS	µg/L	4.7	0.02	0.05	0.06	0.08

PFAS in Waters Extended						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	23/03/2023	23/03/2023	23/03/2023	23/03/2023	23/03/2023
Date analysed	-	23/03/2023	23/03/2023	23/03/2023	23/03/2023	23/03/2023
Perfluorobutanesulfonic acid	µg/L	0.01	0.02	<0.01	<0.01	0.01
Perfluoropentanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.03	0.01	<0.01	<0.01	0.03
Perfluoroheptanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	0.03	0.01	0.01	<0.01	0.03
Perfluorodecanesulfonic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid	µg/L	0.02	<0.02	0.02	<0.02	<0.02
Perfluoropentanoic acid	µg/L	0.03	<0.02	<0.02	<0.02	0.03
Perfluorohexanoic acid	µg/L	0.02	0.01	0.01	<0.01	0.02
Perfluoroheptanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	0.01
Perfluorooctanoic acid PFOA	µg/L	0.02	0.01	<0.01	<0.01	0.02
Perfluorononanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
6:2 FTS	µg/L	<0.01	0.12	<0.01	<0.01	0.01
8:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
10:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	101	102	99	96	98
Surrogate $^{13}C_2$ *PFOA*	%	81	77	81	74	78
Extracted ISTD $^{13}C_3$ *PFBS*	%	81	82	84	80	76
Extracted ISTD $^{18}O_2$ *PFHxS*	%	79	80	80	74	77
Extracted ISTD $^{13}C_4$ *PFOS*	%	103	99	102	104	102
Extracted ISTD $^{13}C_4$ *PFBA*	%	69	82	75	75	53

PFAS in Waters Extended						
Our Reference		319210-6	319210-7	319210-8	319210-9	319210-10
Your Reference	UNITS	BH009S	BH009d	BH035	BH038	BH038d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	73	79	78	71	70
Extracted ISTD $^{13}C_2$ *PFHxA*	%	95	95	96	88	93
Extracted ISTD $^{13}C_4$ *PFHpA*	%	106	103	103	100	103
Extracted ISTD $^{13}C_4$ *PFOA*	%	107	105	106	103	103
Extracted ISTD $^{13}C_5$ *PFNA*	%	103	96	101	96	101
Extracted ISTD $^{13}C_2$ *PFDA*	%	103	102	106	103	103
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	116	108	116	110	115
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	127	115	118	130	126
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	93	81	79	88	89
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	103	99	118	72	93
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	101	89	115	71	86
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	117	111	127	100	112
Extracted ISTD $^{13}C_8$ *FOSA*	%	96	95	100	102	101
Extracted ISTD d_3 *N MeFOSA*	%	88	103	107	100	108
Extracted ISTD d_5 *N EtFOSA*	%	115	118	121	120	123
Extracted ISTD d_7 *N MeFOSE*	%	91	107	104	101	104
Extracted ISTD d_9 *N EtFOSE*	%	111	113	117	111	115
Extracted ISTD d_3 *N MeFOSAA*	%	124	112	138	104	121
Extracted ISTD d_5 *N EtFOSAA*	%	103	99	113	89	98
Total Positive PFHxS & PFOS	µg/L	0.06	0.03	0.01	<0.01	0.06
Total Positive PFOA & PFOS	µg/L	0.05	0.03	0.01	<0.01	0.05
Total Positive PFAS	µg/L	0.16	0.20	0.05	<0.01	0.17

Dissolved Gases in Water						
Our Reference		319210-1	319210-2	319210-3	319210-4	319210-5
Your Reference	UNITS	BH126	BH715B	SMWBH001	MC003S	MC003d
Date Sampled		21/03/2023	21/03/2023	21/03/2023	21/03/2023	21/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	29/03/2023	29/03/2023	29/03/2023	29/03/2023	29/03/2023
Date analysed	-	29/03/2023	29/03/2023	29/03/2023	29/03/2023	29/03/2023
Methane	µg/L	2,200	190	<5	<5	<5

Method ID	Methodology Summary
AT-006	Dissolved gases determined by GC-FID based on draft method USEPA SOP RSK175
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	[NT]
Date extracted	-			27/03/2023	7	27/03/2023	27/03/2023		27/03/2023	[NT]
Date analysed	-			28/03/2023	7	28/03/2023	28/03/2023		28/03/2023	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	7	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	7	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	7	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	7	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	7	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	7	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	7	<1	<1	0	94	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	7	<1	<1	0	96	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	7	<1	<1	0	107	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	7	<1	<1	0	88	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	7	<1	<1	0	90	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	7	<1	<1	0	81	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	7	<1	<1	0	80	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	7	<1	<1	0	99	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	7	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	[NT]
o-xylene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	104	7	95	100	5	99	[NT]
Surrogate toluene-d8	%		Org-023	100	7	99	100	1	100	[NT]
Surrogate 4-BFB	%		Org-023	100	7	100	100	0	100	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	[NT]
Date extracted	-			27/03/2023	7	27/03/2023	27/03/2023		27/03/2023	[NT]
Date analysed	-			28/03/2023	7	28/03/2023	28/03/2023		28/03/2023	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	7	<10	<10	0	95	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	7	<10	<10	0	95	[NT]
Benzene	µg/L	1	Org-023	<1	7	<1	<1	0	96	[NT]
Toluene	µg/L	1	Org-023	<1	7	<1	<1	0	95	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	7	<1	<1	0	91	[NT]
m+p-xylene	µg/L	2	Org-023	<2	7	<2	<2	0	96	[NT]
o-xylene	µg/L	1	Org-023	<1	7	<1	<1	0	96	[NT]
Naphthalene	µg/L	1	Org-023	<1	7	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	104	7	95	100	5	99	[NT]
Surrogate toluene-d8	%		Org-023	100	7	99	100	1	100	[NT]
Surrogate 4-BFB	%		Org-023	100	7	100	100	0	100	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			27/03/2023	1	27/03/2023	27/03/2023		27/03/2023	[NT]
Date analysed	-			28/03/2023	1	28/03/2023	28/03/2023		28/03/2023	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	520	540	4	102	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	1100	1200	9	108	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	110	110	0	86	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	700	720	3	102	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	940	1000	6	108	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	86	[NT]
Surrogate o-Terphenyl	%		Org-020	91	1	95	98	3	92	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	319210-2
Date extracted	-			27/03/2023	1	27/03/2023	27/03/2023		27/03/2023	27/03/2023
Date analysed	-			28/03/2023	1	28/03/2023	28/03/2023		28/03/2023	28/03/2023
Naphthalene	µg/L	0.2	Org-022/025	<0.2	1	10	10	0	71	73
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	0.1	0.1	0	79	79
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	84
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	0.1	0.1	0	87	85
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	83	85
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	91
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	66	63
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	79	80
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	95	1	97	97	0	101	101

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	319210-2
Date prepared	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	24/03/2023
Date analysed	-			27/03/2023	1	27/03/2023	27/03/2023		27/03/2023	27/03/2023
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	3	3	0	95	103
Boron-Dissolved	µg/L	20	Metals-022	<20	1	1500	1500	0	100	97
Barium-Dissolved	µg/L	1	Metals-022	<1	1	950	970	2	100	105
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	1	<0.5	<0.5	0	99	105
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	95	101
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	14	14	0	99	102
Copper-Dissolved	µg/L	1	Metals-022	<1	1	2	2	0	97	98
Cobalt-Dissolved	µg/L	1	Metals-022	<1	1	8	8	0	97	100
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	115	96
Manganese-Dissolved	µg/L	5	Metals-022	<5	1	32	32	0	98	110
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	1	3	3	0	95	99
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	25	24	4	98	100
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	101	102
Antimony-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	84	113
Selenium-Dissolved	µg/L	1	Metals-022	<1	1	<1	1	0	97	98
Tin-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	97	104
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	17	18	6	97	102
Iron-Dissolved	µg/L	10	Metals-022	<10	1	210	210	0	97	92

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	319210-2
Date prepared	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	24/03/2023
Date analysed	-			27/03/2023	1	27/03/2023	27/03/2023		27/03/2023	27/03/2023
Arsenic-Total	µg/L	1	Metals-022	<1	1	5	5	0	104	119
Boron-Total	µg/L	20	Metals-022	<20	1	1600	1600	0	108	#
Barium-Total	µg/L	1	Metals-022	<1	1	1200	1200	0	107	128
Beryllium-Total	µg/L	0.5	Metals-022	<0.5	1	<0.5	<0.5	0	104	124
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	108	126
Chromium-Total	µg/L	1	Metals-022	<1	1	30	29	3	107	124
Copper-Total	µg/L	1	Metals-022	<1	1	8	7	13	104	107
Cobalt-Total	µg/L	1	Metals-022	<1	1	11	11	0	104	115
Mercury-Total	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	113	101
Manganese-Total	µg/L	5	Metals-022	<5	1	53	50	6	106	#
Molybdenum-Total	µg/L	1	Metals-022	<1	1	3	3	0	109	108
Nickel-Total	µg/L	1	Metals-022	<1	1	32	30	6	106	112
Lead-Total	µg/L	1	Metals-022	<1	1	8	8	0	107	115
Antimony-Total	µg/L	1	Metals-022	<1	1	<1	<1	0	118	108
Selenium-Total	µg/L	1	Metals-022	<1	1	1	1	0	104	117
Tin-Total	µg/L	1	Metals-022	<1	1	<1	<1	0	114	125
Zinc-Total	µg/L	1	Metals-022	<1	1	49	43	13	104	119
Iron-Total	µg/L	10	Metals-022	<10	1	5300	5100	4	105	#

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	6	24/03/2023	24/03/2023		[NT]	[NT]
Date analysed	-			[NT]	6	27/03/2023	27/03/2023		[NT]	[NT]
Arsenic-Total	µg/L	1	Metals-022	[NT]	6	52	[NT]		[NT]	[NT]
Boron-Total	µg/L	20	Metals-022	[NT]	6	100	[NT]		[NT]	[NT]
Barium-Total	µg/L	1	Metals-022	[NT]	6	9700	[NT]		[NT]	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	[NT]	6	31	[NT]		[NT]	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	[NT]	6	0.8	[NT]		[NT]	[NT]
Chromium-Total	µg/L	1	Metals-022	[NT]	6	71	[NT]		[NT]	[NT]
Copper-Total	µg/L	1	Metals-022	[NT]	6	680	[NT]		[NT]	[NT]
Cobalt-Total	µg/L	1	Metals-022	[NT]	6	280	[NT]		[NT]	[NT]
Mercury-Total	µg/L	0.05	Metals-021	[NT]	6	0.94	0.92	2	[NT]	[NT]
Manganese-Total	µg/L	5	Metals-022	[NT]	6	8500	[NT]		[NT]	[NT]
Molybdenum-Total	µg/L	1	Metals-022	[NT]	6	5	[NT]		[NT]	[NT]
Nickel-Total	µg/L	1	Metals-022	[NT]	6	120	[NT]		[NT]	[NT]
Lead-Total	µg/L	1	Metals-022	[NT]	6	260	[NT]		[NT]	[NT]
Antimony-Total	µg/L	1	Metals-022	[NT]	6	1	[NT]		[NT]	[NT]
Selenium-Total	µg/L	1	Metals-022	[NT]	6	4	[NT]		[NT]	[NT]
Tin-Total	µg/L	1	Metals-022	[NT]	6	5	[NT]		[NT]	[NT]
Zinc-Total	µg/L	1	Metals-022	[NT]	6	880	[NT]		[NT]	[NT]
Iron-Total	µg/L	10	Metals-022	[NT]	6	48000	[NT]		[NT]	[NT]

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	9	24/03/2023	24/03/2023		[NT]	[NT]
Date analysed	-			[NT]	9	27/03/2023	27/03/2023		[NT]	[NT]
Arsenic-Total	µg/L	1	Metals-022	[NT]	9	4	[NT]		[NT]	[NT]
Boron-Total	µg/L	20	Metals-022	[NT]	9	60	[NT]		[NT]	[NT]
Barium-Total	µg/L	1	Metals-022	[NT]	9	9300	[NT]		[NT]	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	[NT]	9	<0.5	[NT]		[NT]	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	[NT]	9	<0.1	[NT]		[NT]	[NT]
Chromium-Total	µg/L	1	Metals-022	[NT]	9	18	[NT]		[NT]	[NT]
Copper-Total	µg/L	1	Metals-022	[NT]	9	18	[NT]		[NT]	[NT]
Cobalt-Total	µg/L	1	Metals-022	[NT]	9	9	[NT]		[NT]	[NT]
Mercury-Total	µg/L	0.05	Metals-021	[NT]	9	0.06	0.07	15	[NT]	[NT]
Manganese-Total	µg/L	5	Metals-022	[NT]	9	230	[NT]		[NT]	[NT]
Molybdenum-Total	µg/L	1	Metals-022	[NT]	9	2	[NT]		[NT]	[NT]
Nickel-Total	µg/L	1	Metals-022	[NT]	9	16	[NT]		[NT]	[NT]
Lead-Total	µg/L	1	Metals-022	[NT]	9	15	[NT]		[NT]	[NT]
Antimony-Total	µg/L	1	Metals-022	[NT]	9	1	[NT]		[NT]	[NT]
Selenium-Total	µg/L	1	Metals-022	[NT]	9	<1	[NT]		[NT]	[NT]
Tin-Total	µg/L	1	Metals-022	[NT]	9	2	[NT]		[NT]	[NT]
Zinc-Total	µg/L	1	Metals-022	[NT]	9	51	[NT]		[NT]	[NT]
Iron-Total	µg/L	10	Metals-022	[NT]	9	7100	[NT]		[NT]	[NT]

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	10	24/03/2023	24/03/2023		[NT]	[NT]
Date analysed	-			[NT]	10	27/03/2023	27/03/2023		[NT]	[NT]
Arsenic-Total	µg/L	1	Metals-022	[NT]	10	10	[NT]		[NT]	[NT]
Boron-Total	µg/L	20	Metals-022	[NT]	10	100	[NT]		[NT]	[NT]
Barium-Total	µg/L	1	Metals-022	[NT]	10	660	[NT]		[NT]	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	[NT]	10	7	[NT]		[NT]	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	[NT]	10	0.7	[NT]		[NT]	[NT]
Chromium-Total	µg/L	1	Metals-022	[NT]	10	29	[NT]		[NT]	[NT]
Copper-Total	µg/L	1	Metals-022	[NT]	10	150	[NT]		[NT]	[NT]
Cobalt-Total	µg/L	1	Metals-022	[NT]	10	59	[NT]		[NT]	[NT]
Mercury-Total	µg/L	0.05	Metals-021	[NT]	10	0.07	0.06	15	[NT]	[NT]
Manganese-Total	µg/L	5	Metals-022	[NT]	10	2300	[NT]		[NT]	[NT]
Molybdenum-Total	µg/L	1	Metals-022	[NT]	10	2	[NT]		[NT]	[NT]
Nickel-Total	µg/L	1	Metals-022	[NT]	10	58	[NT]		[NT]	[NT]
Lead-Total	µg/L	1	Metals-022	[NT]	10	34	[NT]		[NT]	[NT]
Antimony-Total	µg/L	1	Metals-022	[NT]	10	<1	[NT]		[NT]	[NT]
Selenium-Total	µg/L	1	Metals-022	[NT]	10	<1	[NT]		[NT]	[NT]
Tin-Total	µg/L	1	Metals-022	[NT]	10	3	[NT]		[NT]	[NT]
Zinc-Total	µg/L	1	Metals-022	[NT]	10	660	[NT]		[NT]	[NT]
Iron-Total	µg/L	10	Metals-022	[NT]	10	38000	[NT]		[NT]	[NT]

QUALITY CONTROL: Metals in Waters - Total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319210-3
Date prepared	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	24/03/2023
Date analysed	-			27/03/2023	1	27/03/2023	27/03/2023		27/03/2023	27/03/2023
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	1	0.3	0.3	0	108	113

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319210-2
Date prepared	-			22/03/2023	1	22/03/2023	22/03/2023		22/03/2023	22/03/2023
Date analysed	-			22/03/2023	1	22/03/2023	22/03/2023		22/03/2023	22/03/2023
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	210	270	25	104	87
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.077	0.079	3	109	96
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	1	220	260	17	105	86

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	10	22/03/2023	22/03/2023		[NT]	[NT]
Date analysed	-			[NT]	10	22/03/2023	22/03/2023		[NT]	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	[NT]	10	0.071	[NT]		[NT]	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	[NT]	10	0.02	[NT]		[NT]	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	[NT]	10	0.2	0.2	0	[NT]	[NT]

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319210-2
Date prepared	-			23/03/2023	1	22/03/2023	22/03/2023		23/03/2023	23/03/2023
Date analysed	-			23/03/2023	1	22/03/2023	22/03/2023		23/03/2023	23/03/2023
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	31	31	0	115	#
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	350	340	3	93	78
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	2100	2000	5	103	#
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	60	60	0	105	107
Hardness	mgCaCO 3 /L	3	Metals-020	[NT]	1	320	320	0	[NT]	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	1200	1200	0	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	1200	1200	0	97	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	2	2	0	115	94
Chloride, Cl	mg/L	1	Inorg-081	<1	1	3400	3400	0	106	#
Ionic Balance	%		Inorg-040	[NT]	1	-6.0	-8.0	-29	[NT]	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			23/03/2023	1	23/03/2023	23/03/2023		23/03/2023	[NT]
Date analysed	-			23/03/2023	1	23/03/2023	23/03/2023		23/03/2023	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	0.22	0.22	0	108	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	0.14	0.15	7	104	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	1	0.39	0.42	7	112	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	101	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	1	0.20	0.21	5	102	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	95	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	1	1.8	1.6	12	106	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	1	0.41	0.47	14	117	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	1	0.63	0.71	12	112	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	1	0.21	0.22	5	101	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	1	0.48	0.51	6	98	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	1	0.06	0.06	0	98	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	111	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	101	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	111	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	99	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	114	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	106	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	1	0.02	0.02	0	111	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	113	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	120	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	108	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	106	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	88	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	113	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	121	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	100	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	0.1	0.1	0	104	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	99	1	99	97	2	97	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	82	1	66	72	9	84	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	85	1	64	64	0	84	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	84	1	66	68	3	86	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	99	1	99	103	4	96	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	89	1	52	54	4	89	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	80	1	29	27	7	79	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	90	1	62	62	0	90	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	100	1	94	95	1	97	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	101	1	100	96	4	96	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	94	1	92	90	2	94	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	102	1	59	59	0	97	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	105	1	131	121	8	105	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	120	1	129	131	2	114	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	86	1	79	78	1	88	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	97	1	137	143	4	95	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	98	1	103	98	5	91	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	116	1	153	162	6	109	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	102	1	74	74	0	97	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	106	1	106	114	7	106	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	115	1	125	132	5	113	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	101	1	89	100	12	103	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	114	1	118	122	3	107	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	118	1	150	159	6	112	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	107	1	96	98	2	107	[NT]

QUALITY CONTROL: Dissolved Gases in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			29/03/2023	1	29/03/2023	29/03/2023		29/03/2023	[NT]
Date analysed	-			29/03/2023	1	29/03/2023	29/03/2023		29/03/2023	[NT]
Methane	µg/L	5	AT-006	<5	1	2200	2300	4	102	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

All metals in water - total - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

VOCs in water - The PQL has been raised as sample 319210-1 was foamy and therefore required a dilution.

vTRH & BTEXN in Water NEPM - The PQL has been raised as sample 319210-1 was foamy and therefore required a dilution.

Ion Balance - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

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CERTIFICATE OF ANALYSIS 319478

Client Details

Client	CTP AFJV
Attention	[redacted]
Address	7 Figtree Dr, SYDNEY OLYMPIC PARK, NSW, 2127

Sample Details

Your Reference	**CTP Groundwater Monitoring**
Number of Samples	5 Water
Date samples received	22/02/2023
Date completed instructions received	24/02/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	31/03/2023
Date of Issue	31/03/2023

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Results Approved By
Ashley Miller, Development Chemist
Diego Bigolin, Inorganics Supervisor
Jenny He, Senior Chemist
Kyle Gavrily, Senior Chemist
Loren Bardwell, Development Chemist
Nancy Zhang, Laboratory Manager, Sydney

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Date analysed	-	29/03/2023	29/03/2023	29/03/2023	29/03/2023	29/03/2023
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1

VOCs in water						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Bromoform	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	110	107	107	107	106
Surrogate toluene-d8	%	99	99	99	99	99
Surrogate 4-BFB	%	102	101	102	103	101

vTRH(C6-C10)/BTEXN in Water						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Date analysed	-	29/03/2023	29/03/2023	29/03/2023	29/03/2023	29/03/2023
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	110	107	107	107	106
Surrogate toluene-d8	%	99	99	99	99	99
Surrogate 4-BFB	%	102	101	102	103	101

svTRH (C10-C40) in Water						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Date analysed	-	29/03/2023	29/03/2023	29/03/2023	29/03/2023	29/03/2023
TRH C_{10} - C_{14}	µg/L	110	<50	<50	74	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	110	<50	<50	70	<50
TRH >C_{10} - C_{16}	µg/L	110	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	110	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	110	<50	<50	<50	<50
Surrogate o-Terphenyl	%	118	109	115	107	98

PAHs in Water						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	98	94	96	95	86

All metals in water-dissolved						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Arsenic-Dissolved	µg/L	<1	<1	<1	4	<1
Boron-Dissolved	µg/L	430	30	40	50	100
Barium-Dissolved	µg/L	170	55	130	19	96
Beryllium-Dissolved	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	2	<1	<1	<1	<1
Copper-Dissolved	µg/L	410	1	<1	4	7
Cobalt-Dissolved	µg/L	1	<1	<1	7	2
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Dissolved	µg/L	22	20	14	1,200	140
Molybdenum-Dissolved	µg/L	17	7	8	1	7
Nickel-Dissolved	µg/L	9	1	<1	9	21
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Antimony-Dissolved	µg/L	2	<1	<1	<1	<1
Selenium-Dissolved	µg/L	<1	<1	<1	<1	<1
Tin-Dissolved	µg/L	<1	<1	<1	<1	<1
Zinc-Dissolved	µg/L	16	<1	<1	69	110
Iron-Dissolved	µg/L	<10	<10	<10	<10	<10

All metals in water - total						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Arsenic-Total	µg/L	1	5	<1	5	<1
Boron-Total	µg/L	390	30	40	40	100
Barium-Total	µg/L	190	210	130	19	93
Beryllium-Total	µg/L	<0.5	0.9	<0.5	<0.5	<0.5
Cadmium-Total	µg/L	<0.1	0.2	<0.1	<0.1	<0.1
Chromium-Total	µg/L	12	17	3	3	4
Copper-Total	µg/L	3,400	36	3	2	9
Cobalt-Total	µg/L	2	9	<1	7	3
Mercury-Total	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Total	µg/L	36	260	32	1,100	160
Molybdenum-Total	µg/L	19	7	8	1	8
Nickel-Total	µg/L	23	17	3	10	22
Lead-Total	µg/L	<1	12	<1	<1	<1
Antimony-Total	µg/L	2	1	<1	<1	1
Selenium-Total	µg/L	<1	<1	<1	<1	<1
Tin-Total	µg/L	<1	<1	<1	<1	<1
Zinc-Total	µg/L	22	96	21	42	84
Iron-Total	µg/L	910	12,000	360	220	250

Metals in Waters - Total						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Date analysed	-	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
Phosphorus - Total	mg/L	0.1	0.4	<0.05	<0.05	<0.05

Miscellaneous Inorganics						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Ammonia as N in water	mg/L	4.5	<0.005	1.5	2.3	0.080
Nitrate as N in water	mg/L	0.19	0.02	0.11	0.078	0.85
Total Nitrogen in water	mg/L	6.2	0.2	1.7	2.5	1.3

Ion Balance						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Date analysed	-	24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
Calcium - Dissolved	mg/L	1,100	25	120	43	180
Potassium - Dissolved	mg/L	310	4	40	36	45
Sodium - Dissolved	mg/L	9,600	26	2,000	1,200	3,000
Magnesium - Dissolved	mg/L	110	2	54	58	340
Hardness	mgCaCO 3 /L	3,100	68	520	350	1,900
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	48	110	24	650	610
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	<5	6	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	48	110	30	650	610
Sulphate, SO4	mg/L	2,300	52	800	600	530
Chloride, Cl	mg/L	15,000	20	3,500	1,600	6,000
Ionic Balance	%	2.0	-19	-9.0	-9.0	-7.0

PFAS in Waters Extended						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Date analysed	-	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
Perfluorobutanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid	µg/L	<0.02	0.06	<0.02	<0.02	<0.02
Perfluorohexanoic acid	µg/L	0.01	0.02	<0.01	<0.01	<0.01
Perfluoroheptanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	µg/L	<0.02	<0.02	<0.04	<0.02	<0.02
Perfluorododecanoic acid	µg/L	<0.05	<0.05	<0.1	<0.05	<0.05
Perfluorotridecanoic acid	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
6:2 FTS	µg/L	0.06	0.16	0.23	<0.01	<0.01
8:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
10:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.04	<0.02	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	99	101	98	104	102
Surrogate $^{13}C_2$ *PFOA*	%	109	105	107	106	105
Extracted ISTD $^{13}C_3$ *PFBS*	%	102	106	104	108	106
Extracted ISTD $^{18}O_2$ *PFHxS*	%	107	108	108	108	107
Extracted ISTD $^{13}C_4$ *PFOS*	%	106	86	77	94	105
Extracted ISTD $^{13}C_4$ *PFBA*	%	67	83	77	75	94

PFAS in Waters Extended						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	101	104	103	104	107
Extracted ISTD $^{13}C_2$ *PFHxA*	%	98	103	99	101	102
Extracted ISTD $^{13}C_4$ *PFHpA*	%	95	96	92	94	97
Extracted ISTD $^{13}C_4$ *PFOA*	%	94	100	88	100	105
Extracted ISTD $^{13}C_5$ *PFNA*	%	110	93	84	103	117
Extracted ISTD $^{13}C_2$ *PFDA*	%	99	73	60	83	107
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	85	62	44	67	101
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	82	54	35	63	101
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	69	27	20	33	72
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	75	108	73	78	83
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	59	91	61	76	81
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	74	76	57	77	97
Extracted ISTD $^{13}C_8$ *FOSA*	%	83	66	59	81	96
Extracted ISTD d_3 *N MeFOSA*	%	90	78	80	88	100
Extracted ISTD d_5 *N EtFOSA*	%	94	73	71	85	98
Extracted ISTD d_7 *N MeFOSE*	%	99	74	68	88	103
Extracted ISTD d_9 *N EtFOSE*	%	108	78	67	96	115
Extracted ISTD d_3 *N MeFOSAA*	%	61	62	46	67	80
Extracted ISTD d_5 *N EtFOSAA*	%	64	63	50	71	87
Total Positive PFHxS & PFOS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Total Positive PFOA & PFOS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Total Positive PFAS	µg/L	0.07	0.24	0.23	<0.01	<0.01

Dissolved Gases in Water						
Our Reference		319478-1	319478-2	319478-3	319478-4	319478-5
Your Reference	UNITS	BH121	BH068d	MW001d	MW001s	BH120
Date Sampled		22/03/2023	22/03/2023	22/03/2023	22/03/2023	22/03/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	31/03/2023	31/03/2023	31/03/2023	31/03/2023	31/03/2023
Date analysed	-	31/03/2023	31/03/2023	31/03/2023	31/03/2023	31/03/2023
Methane	µg/L	<5	<5	<5	<5	<5

Method ID	Methodology Summary
AT-006	Dissolved gases determined by GC-FID based on draft method USEPA SOP RSK175
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			28/03/2023	[NT]	[NT]	[NT]	[NT]	28/03/2023	[NT]
Date analysed	-			29/03/2023	[NT]	[NT]	[NT]	[NT]	29/03/2023	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	108	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate toluene-d8	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			28/03/2023	[NT]	[NT]	[NT]	[NT]	28/03/2023	[NT]
Date analysed	-			29/03/2023	[NT]	[NT]	[NT]	[NT]	29/03/2023	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	109	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	109	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	108	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate toluene-d8	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			28/03/2023	1	28/03/2023	28/03/2023		28/03/2023	[NT]
Date analysed	-			29/03/2023	1	29/03/2023	29/03/2023		29/03/2023	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	110	75	38	77	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	<100	0	92	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	86	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	110	80	32	77	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	<100	0	92	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	86	[NT]
Surrogate o-Terphenyl	%		Org-020	100	1	118	98	19	102	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	319478-2
Date extracted	-			28/03/2023	1	28/03/2023	28/03/2023		28/03/2023	28/03/2023
Date analysed	-			28/03/2023	1	28/03/2023	28/03/2023		28/03/2023	28/03/2023
Naphthalene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	71	76
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	79	86
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	91
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	92
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	83	87
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	92
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	66	68
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	79	86
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	95	1	98	99	1	101	92

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			28/03/2023	[NT]	[NT]	[NT]	[NT]	28/03/2023	[NT]
Date analysed	-			28/03/2023	[NT]	[NT]	[NT]	[NT]	28/03/2023	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Boron-Dissolved	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	95	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	92	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	120	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	95	[NT]
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Antimony-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Tin-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319478-4
Date prepared	-			28/03/2023	3	28/03/2023	28/03/2023		28/03/2023	28/03/2023
Date analysed	-			28/03/2023	3	28/03/2023	28/03/2023		28/03/2023	28/03/2023
Arsenic-Total	µg/L	1	Metals-022	<1	3	<1	<1	0	100	109
Boron-Total	µg/L	20	Metals-022	<20	3	40	30	29	105	109
Barium-Total	µg/L	1	Metals-022	<1	3	130	130	0	110	117
Beryllium-Total	µg/L	0.5	Metals-022	<0.5	3	<0.5	<0.5	0	103	111
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	3	<0.1	<0.1	0	105	114
Chromium-Total	µg/L	1	Metals-022	<1	3	3	3	0	103	107
Copper-Total	µg/L	1	Metals-022	<1	3	3	3	0	101	102
Cobalt-Total	µg/L	1	Metals-022	<1	3	<1	<1	0	100	104
Mercury-Total	µg/L	0.05	Metals-021	<0.05	3	<0.05	[NT]		110	[NT]
Manganese-Total	µg/L	5	Metals-022	<5	3	32	33	3	103	#
Molybdenum-Total	µg/L	1	Metals-022	<1	3	8	8	0	104	110
Nickel-Total	µg/L	1	Metals-022	<1	3	3	3	0	100	102
Lead-Total	µg/L	1	Metals-022	<1	3	<1	<1	0	104	105
Antimony-Total	µg/L	1	Metals-022	<1	3	<1	<1	0	112	118
Selenium-Total	µg/L	1	Metals-022	<1	3	<1	<1	0	103	105
Tin-Total	µg/L	1	Metals-022	<1	3	<1	<1	0	110	117
Zinc-Total	µg/L	1	Metals-022	<1	3	21	21	0	101	106
Iron-Total	µg/L	10	Metals-022	<10	3	360	370	3	81	#

QUALITY CONTROL: Metals in Waters - Total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319478-4
Date prepared	-			28/03/2023	3	28/03/2023	28/03/2023		28/03/2023	28/03/2023
Date analysed	-			28/03/2023	3	28/03/2023	28/03/2023		28/03/2023	28/03/2023
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	3	<0.05	<0.05	0	94	108

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319478-2
Date prepared	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	24/03/2023
Date analysed	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	24/03/2023
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	4.5	4.4	2	93	94
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.19	0.20	5	109	101
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	1	6.2	6.2	0	98	89

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	319478-2
Date prepared	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	24/03/2023
Date analysed	-			24/03/2023	1	24/03/2023	24/03/2023		24/03/2023	24/03/2023
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	1100	[NT]		85	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	310	[NT]		88	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	9600	[NT]		98	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	110	[NT]		84	[NT]
Hardness	mgCaCO 3 /L	3	Metals-020	[NT]	1	3100	[NT]		[NT]	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	48	42	13	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	6	18	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	48	48	0	93	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	2300	2400	4	98	93
Chloride, Cl	mg/L	1	Inorg-081	<1	1	15000	16000	6	92	103
Ionic Balance	%		Inorg-040	[NT]	1	2.0	[NT]		[NT]	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			27/03/2023	1	27/03/2023	27/03/2023		27/03/2023	[NT]
Date analysed	-			27/03/2023	1	27/03/2023	27/03/2023		27/03/2023	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	104	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	106	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	106	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	106	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	108	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	84	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	104	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	102	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	1	0.01	0.02	67	105	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	107	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	103	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	105	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	108	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	102	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	104	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	96	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	105	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	104	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	1	0.06	0.06	0	106	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	106	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	113	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	110	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	113	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	108	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	105	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	102	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	117	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	109	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	100	1	99	100	1	98	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	102	1	109	107	2	100	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	100	1	102	103	1	96	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	102	1	107	105	2	101	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	101	1	106	106	0	99	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	103	1	67	68	1	100	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	105	1	101	101	0	103	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	102	1	98	98	0	100	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	99	1	95	93	2	98	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	103	1	94	91	3	103	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	115	1	110	109	1	109	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	104	1	99	93	6	104	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	108	1	85	81	5	104	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	108	1	82	75	9	103	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	86	1	69	57	19	84	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	104	1	75	61	21	99	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	107	1	59	50	17	99	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	123	1	74	54	31	111	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	100	1	83	80	4	93	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	101	1	90	89	1	99	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	102	1	94	90	4	99	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	98	1	99	98	1	95	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	99	1	108	108	0	101	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	108	1	61	55	10	100	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	114	1	64	57	12	107	[NT]

QUALITY CONTROL: Dissolved Gases in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			31/03/2021	1	31/03/2023	31/03/2023		31/03/2021	[NT]
Date analysed	-			31/03/2021	1	31/03/2023	31/03/2023		31/03/2021	[NT]
Methane	µg/L	5	AT-006	<5	1	<5	<5	0	120	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

All metals in water - total - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

TRACE METALS: In theory the total metal content should be higher than the dissolved metal content. However, in some samples this is not the case. The sample has been re-analysed for both Total and Dissolved metals and results have been confirmed.

The mass inbalance may be caused by other ions that have not been measured.

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CERTIFICATE OF ANALYSIS 319489

Client Details

Client	CTP AFJV
Attention	[redacted]
Address	7 Figtree Dr, SYDNEY OLYMPIC PARK, NSW, 2127

Sample Details

Your Reference	**CTP Groundwater Monitoring**
Number of Samples	1 Water
Date samples received	24/03/2023
Date completed instructions received	24/03/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	31/03/2023
Date of Issue	31/03/2023

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Results Approved By
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Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date extracted	-	28/03/2023
Date analysed	-	29/03/2023
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	<1
Bromochloromethane	µg/L	<1
Chloroform	µg/L	<1
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Cyclohexane	µg/L	<1
Carbon tetrachloride	µg/L	<1
Benzene	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	<1
Bromodichloromethane	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
Toluene	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Ethylbenzene	µg/L	<1

VOCs in water		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Bromoform	µg/L	<1
m+p-xylene	µg/L	<2
Styrene	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
o-xylene	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Isopropylbenzene	µg/L	<1
Bromobenzene	µg/L	<1
n-propyl benzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3,5-trimethyl benzene	µg/L	<1
Tert-butyl benzene	µg/L	<1
1,2,4-trimethyl benzene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
Sec-butyl benzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
4-isopropyl toluene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
n-butyl benzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	108
Surrogate toluene-d8	%	100
Surrogate 4-BFB	%	101

vTRH(C6-C10)/BTEXN in Water		
Our Reference	UNITS	319489-1
Your Reference		BH058
Date Sampled		24/03/2023
Type of sample		Water
Date extracted	-	28/03/2023
Date analysed	-	29/03/2023
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	108
Surrogate toluene-d8	%	100
Surrogate 4-BFB	%	101

svTRH (C10-C40) in Water		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date extracted	-	27/03/2023
Date analysed	-	31/03/2023
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	120
Total +ve TRH (C10-C36)	µg/L	120
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	160
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	160
Surrogate o-Terphenyl	%	66

PAHs in Water		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date extracted	-	27/03/2023
Date analysed	-	27/03/2023
Naphthalene	µg/L	<0.2
Acenaphthylene	µg/L	<0.1
Acenaphthene	µg/L	<0.1
Fluorene	µg/L	<0.1
Phenanthrene	µg/L	<0.1
Anthracene	µg/L	<0.1
Fluoranthene	µg/L	<0.1
Pyrene	µg/L	<0.1
Benzo(a)anthracene	µg/L	<0.1
Chrysene	µg/L	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2
Benzo(a)pyrene	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5
Total +ve PAH's	µg/L	<0.1
Surrogate p-Terphenyl-d14	%	66

All metals in water-dissolved		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date prepared	-	27/03/2023
Date analysed	-	27/03/2023
Arsenic-Dissolved	µg/L	1
Boron-Dissolved	µg/L	100
Barium-Dissolved	µg/L	36
Beryllium-Dissolved	µg/L	<0.5
Cadmium-Dissolved	µg/L	0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	<1
Cobalt-Dissolved	µg/L	26
Mercury-Dissolved	µg/L	<0.05
Manganese-Dissolved	µg/L	420
Molybdenum-Dissolved	µg/L	<1
Nickel-Dissolved	µg/L	28
Lead-Dissolved	µg/L	2
Antimony-Dissolved	µg/L	<1
Selenium-Dissolved	µg/L	<1
Tin-Dissolved	µg/L	<1
Zinc-Dissolved	µg/L	160
Iron-Dissolved	µg/L	15,000

All metals in water - total		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date prepared	-	27/03/2023
Date analysed	-	27/03/2023
Arsenic-Total	µg/L	420
Boron-Total	µg/L	200
Barium-Total	µg/L	13,000
Beryllium-Total	µg/L	55
Cadmium-Total	µg/L	27
Chromium-Total	µg/L	410
Copper-Total	µg/L	720
Cobalt-Total	µg/L	570
Mercury-Total	µg/L	<0.05
Manganese-Total	µg/L	8,300
Molybdenum-Total	µg/L	88
Nickel-Total	µg/L	510
Lead-Total	µg/L	18,000
Antimony-Total	µg/L	2
Selenium-Total	µg/L	3
Tin-Total	µg/L	3
Zinc-Total	µg/L	5,000
Iron-Total	µg/L	540,000

Metals in Waters - Total		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date prepared	-	27/03/2023
Date analysed	-	27/03/2023
Phosphorus - Total	mg/L	1.7

Miscellaneous Inorganics		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date prepared	-	24/03/2023
Date analysed	-	24/03/2023
Ammonia as N in water	mg/L	0.078
Nitrate as N in water	mg/L	0.060
Total Nitrogen in water	mg/L	0.5
Hexavalent Chromium, Cr^{6+}	mg/L	<0.005
Trivalent Chromium, Cr^{3+}	mg/L	0.41

Ion Balance		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date prepared	-	27/03/2023
Date analysed	-	27/03/2023
Calcium - Dissolved	mg/L	45
Potassium - Dissolved	mg/L	4
Sodium - Dissolved	mg/L	170
Magnesium - Dissolved	mg/L	19
Hardness	mgCaCO 3 /L	190
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	35
Carbonate Alkalinity as $CaCO_3$	mg/L	<5
Total Alkalinity as $CaCO_3$	mg/L	35
Sulphate, SO4	mg/L	300
Chloride, Cl	mg/L	210
Ionic Balance	%	-6.0

PFAS in Waters Extended		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date prepared	-	27/03/2023
Date analysed	-	27/03/2023
Perfluorobutanesulfonic acid	µg/L	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02
Perfluorobutanoic acid	µg/L	<0.02
Perfluoropentanoic acid	µg/L	<0.02
Perfluorohexanoic acid	µg/L	<0.01
Perfluoroheptanoic acid	µg/L	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01
Perfluorononanoic acid	µg/L	<0.01
Perfluorodecanoic acid	µg/L	<0.02
Perfluoroundecanoic acid	µg/L	<0.02
Perfluorododecanoic acid	µg/L	<0.05
Perfluorotridecanoic acid	µg/L	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5
4:2 FTS	µg/L	<0.01
6:2 FTS	µg/L	<0.01
8:2 FTS	µg/L	<0.02
10:2 FTS	µg/L	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	99
Surrogate $^{13}C_2$ *PFOA*	%	108
Extracted ISTD $^{13}C_3$ *PFBS*	%	107
Extracted ISTD $^{18}O_2$ *PFHxS*	%	111
Extracted ISTD $^{13}C_4$ *PFOS*	%	107
Extracted ISTD $^{13}C_4$ *PFBA*	%	88

PFAS in Waters Extended		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	106
Extracted ISTD $^{13}C_2$ *PFHxA*	%	107
Extracted ISTD $^{13}C_4$ *PFHpA*	%	101
Extracted ISTD $^{13}C_4$ *PFOA*	%	114
Extracted ISTD $^{13}C_5$ *PFNA*	%	121
Extracted ISTD $^{13}C_2$ *PFDA*	%	114
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	112
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	115
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	82
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	119
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	123
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	161
Extracted ISTD $^{13}C_8$ *FOSA*	%	98
Extracted ISTD d_3 *N MeFOSA*	%	95
Extracted ISTD d_5 *N EtFOSA*	%	98
Extracted ISTD d_7 *N MeFOSE*	%	101
Extracted ISTD d_9 *N EtFOSE*	%	110
Extracted ISTD d_3 *N MeFOSAA*	%	112
Extracted ISTD d_5 *N EtFOSAA*	%	127
Total Positive PFHxS & PFOS	µg/L	<0.01
Total Positive PFOA & PFOS	µg/L	<0.01
Total Positive PFAS	µg/L	<0.01

Dissolved Gases in Water		
Our Reference		319489-1
Your Reference	UNITS	BH058
Date Sampled		24/03/2023
Type of sample		Water
Date prepared	-	31/03/2023
Date analysed	-	31/03/2023
Methane	µg/L	53

Method ID	Methodology Summary
AT-006	Dissolved gases determined by GC-FID based on draft method USEPA SOP RSK175
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-024	Hexavalent Chromium (Cr6+) - determined colourimetrically. Waters samples are filtered on receipt prior to analysis.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			28/03/2023	[NT]	[NT]	[NT]	[NT]	28/03/2023	[NT]
Date analysed	-			29/03/2023	[NT]	[NT]	[NT]	[NT]	29/03/2023	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	108	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate toluene-d8	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			28/03/2023	[NT]	[NT]	[NT]	[NT]	28/03/2023	[NT]
Date analysed	-			29/03/2023	[NT]	[NT]	[NT]	[NT]	29/03/2023	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	109	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	109	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	108	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate toluene-d8	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Date analysed	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	112	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	124	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	112	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	124	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
Surrogate o-Terphenyl	%		Org-020	83	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Date analysed	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	92	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	122	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	124	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	81	[NT]	[NT]	[NT]	[NT]	71	[NT]

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Date analysed	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Boron-Dissolved	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	94	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	97	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	110	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	94	[NT]
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Antimony-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Tin-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	91	[NT]

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Date analysed	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Arsenic-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Boron-Total	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	102	[NT]
Barium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	99	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Chromium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Copper-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Cobalt-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Mercury-Total	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	112	[NT]
Manganese-Total	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	101	[NT]
Molybdenum-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Lead-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Antimony-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Selenium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Tin-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Zinc-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Iron-Total	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: Metals in Waters - Total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Date analysed	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			24/03/2023	[NT]	[NT]	[NT]	[NT]	24/03/2023	[NT]
Date analysed	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	24/03/2023	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	[NT]	[NT]	105	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	[NT]	[NT]	109	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Hexavalent Chromium, Cr^{6+}	mg/L	0.005	Inorg-024	<0.005	[NT]	[NT]	[NT]	[NT]	100	[NT]
Trivalent Chromium, Cr^{3+}	mg/L	0.005	Inorg-024	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: Ion Balance					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Date analysed	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	95	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	83	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	94	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	91	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	96	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Date analysed	-			27/03/2023	[NT]	[NT]	[NT]	[NT]	27/03/2023	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	104	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	106	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	106	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	106	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	108	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	84	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	104	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	107	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	108	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	104	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	105	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	104	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	106	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	106	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	113	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	113	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	105	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	102	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	117	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	109	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	96	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	101	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	105	[NT]	[NT]	[NT]	[NT]	103	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	103	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	115	[NT]	[NT]	[NT]	[NT]	109	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	108	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	108	[NT]	[NT]	[NT]	[NT]	103	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	86	[NT]	[NT]	[NT]	[NT]	84	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	107	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	123	[NT]	[NT]	[NT]	[NT]	111	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	93	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	101	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	108	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	114	[NT]	[NT]	[NT]	[NT]	107	[NT]

QUALITY CONTROL: Dissolved Gases in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			31/03/2023	1	31/03/2023	31/03/2023		31/03/2023	[NT]
Date analysed	-			31/03/2023	1	31/03/2023	31/03/2023		31/03/2023	[NT]
Methane	µg/L	5	AT-006	<5	1	53	55	4	120	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

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CERTIFICATE OF ANALYSIS 321845

Client Details

Client	CTP AFJV
Attention	[redacted]
Address	7 Figtree Dr, SYDNEY OLYMPIC PARK, NSW, 2127

Sample Details

Your Reference	**CTP Groundwater Monitoring**
Number of Samples	5 Water
Date samples received	27/04/2023
Date completed instructions received	27/04/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	04/05/2023
Date of Issue	04/05/2023

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Results Approved By
Amanda Chui, Air Toxics Team Leader
Hannah Nguyen, Metals Supervisor
Kyle Gavrily, Senior Chemist
Liam Timmins, Organics Supervisor
Loren Bardwell, Development Chemist
Nick Sarlamis, Assistant Operation Manager
Phalak Inthakesone, Organics Development Manager, Sydney

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Date analysed	-	27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1

VOCs in water						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Bromoform	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	97	92	99	98	94
Surrogate toluene-d8	%	92	92	91	92	91
Surrogate 4-BFB	%	102	102	103	102	103

vTRH(C6-C10)/BTEXN in Water						
Our Reference	UNITS	321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference		SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Date analysed	-	27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	97	92	99	98	94
Surrogate toluene-d8	%	92	92	91	92	91
Surrogate 4-BFB	%	102	102	103	102	103

svTRH (C10-C40) in Water						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	02/05/2023	02/05/2023	02/05/2023	02/05/2023	02/05/2023
Date analysed	-	03/05/2023	03/05/2023	03/05/2023	03/05/2023	03/05/2023
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	75	78	76	93	82

PAHs in Water						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	02/05/2023	02/05/2023	02/05/2023	02/05/2023	02/05/2023
Date analysed	-	02/05/2023	02/05/2023	02/05/2023	02/05/2023	02/05/2023
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	82	90	95	87	86

All metals in water-dissolved						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	28/04/2023	28/04/2023	28/04/2023	28/04/2023	28/04/2023
Date analysed	-	28/04/2023	28/04/2023	28/04/2023	28/04/2023	28/04/2023
Arsenic-Dissolved	µg/L	<1	<1	<1	2	<1
Boron-Dissolved	µg/L	100	30	70	100	40
Barium-Dissolved	µg/L	52	680	2,100	46	120
Beryllium-Dissolved	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	56	<1	<1	14
Copper-Dissolved	µg/L	6	8	<1	3	4
Cobalt-Dissolved	µg/L	1	3	5	24	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Dissolved	µg/L	230	<5	190	1,300	<5
Molybdenum-Dissolved	µg/L	1	41	1	1	6
Nickel-Dissolved	µg/L	5	3	11	20	1
Lead-Dissolved	µg/L	<1	1	<1	41	<1
Antimony-Dissolved	µg/L	<1	<1	<1	<1	1
Selenium-Dissolved	µg/L	<1	<1	<1	<1	<1
Tin-Dissolved	µg/L	<1	<1	<1	<1	<1
Zinc-Dissolved	µg/L	44	24	18	180	4
Iron-Dissolved	µg/L	<10	170	10	1,900	<10

All metals in water - total						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	01/05/2023	01/05/2023	01/05/2023	01/05/2023	01/05/2023
Date analysed	-	01/05/2023	01/05/2023	01/05/2023	01/05/2023	01/05/2023
Arsenic-Total	µg/L	3	<1	<1	10	<1
Boron-Total	µg/L	100	20	80	100	30
Barium-Total	µg/L	770	760	5,000	310	170
Beryllium-Total	µg/L	1	<0.5	<0.5	14	<0.5
Cadmium-Total	µg/L	<0.1	<0.1	<0.1	1	<0.1
Chromium-Total	µg/L	24	85	9	45	27
Copper-Total	µg/L	20	12	4	200	9
Cobalt-Total	µg/L	15	4	6	75	<1
Mercury-Total	µg/L	0.1	<0.05	<0.05	0.05	<0.05
Manganese-Total	µg/L	930	18	240	2,600	11
Molybdenum-Total	µg/L	3	49	3	1	8
Nickel-Total	µg/L	15	12	15	77	6
Lead-Total	µg/L	11	2	2	54	1
Antimony-Total	µg/L	<1	1	<1	<1	2
Selenium-Total	µg/L	<1	<1	<1	<1	<1
Tin-Total	µg/L	<1	<1	<1	<1	<1
Zinc-Total	µg/L	61	40	25	700	19
Iron-Total	µg/L	4,200	620	1,400	49,000	270

Metals in Waters - Total						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	01/05/2023	01/05/2023	01/05/2023	01/05/2023	01/05/2023
Date analysed	-	01/05/2023	01/05/2023	01/05/2023	01/05/2023	01/05/2023
Phosphorus - Total	mg/L	0.3	<0.05	<0.05	1.4	<0.05

Miscellaneous Inorganics						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Date analysed	-	27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Ammonia as N in water	mg/L	<0.005	0.69	0.93	0.066	<0.005
Nitrate as N in water	mg/L	0.02	1.5	0.89	0.072	0.74
Total Nitrogen in water	mg/L	0.1	3.0	2.2	0.3	1.0

Ion Balance						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Date analysed	-	27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Calcium - Dissolved	mg/L	45	270	410	27	280
Potassium - Dissolved	mg/L	4	19	40	5	4
Sodium - Dissolved	mg/L	99	190	1,700	340	95
Magnesium - Dissolved	mg/L	13	<0.5	260	12	<0.5
Hardness	mgCaCO 3 /L	170	670	2,100	120	710
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	540	<5	<5	350
Bicarbonate Alkalinity as $CaCO_3$	mg/L	240	<5	560	94	<5
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	60	<5	<5	59
Total Alkalinity as $CaCO_3$	mg/L	240	600	560	94	410
Sulphate, SO4	mg/L	60	24	32	230	260
Chloride, Cl	mg/L	90	310	4,100	360	170
Ionic Balance	%	-5.0	2.0	-4.0	2.0	0

PFAS in Waters Extended						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	28/04/2023	28/04/2023	28/04/2023	28/04/2023	28/04/2023
Date analysed	-	28/04/2023	28/04/2023	28/04/2023	28/04/2023	28/04/2023
Perfluorobutanesulfonic acid	µg/L	<0.01	0.03	<0.01	<0.01	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.02	0.01	<0.01	0.03	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	0.02	<0.01	<0.01	0.02	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid	µg/L	<0.01	0.01	<0.01	0.01	0.01
Perfluoroheptanoic acid	µg/L	<0.01	<0.01	<0.01	0.01	<0.01
Perfluorooctanoic acid PFOA	µg/L	0.02	0.02	<0.01	0.01	<0.01
Perfluorononanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
6:2 FTS	µg/L	<0.01	0.12	<0.01	<0.01	<0.01
8:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
10:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	102	100	98	103	101
Surrogate $^{13}C_2$ *PFOA*	%	100	100	90	89	85
Extracted ISTD $^{13}C_3$ *PFBS*	%	92	92	88	89	93
Extracted ISTD $^{18}O_2$ *PFHxS*	%	101	105	92	97	101
Extracted ISTD $^{13}C_4$ *PFOS*	%	89	93	95	94	92
Extracted ISTD $^{13}C_4$ *PFBA*	%	86	92	80	49	85

PFAS in Waters Extended						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	96	100	78	84	94
Extracted ISTD $^{13}C_2$ *PFHxA*	%	102	104	92	99	100
Extracted ISTD $^{13}C_4$ *PFHpA*	%	97	98	96	101	103
Extracted ISTD $^{13}C_4$ *PFOA*	%	102	102	98	106	107
Extracted ISTD $^{13}C_5$ *PFNA*	%	111	117	108	115	115
Extracted ISTD $^{13}C_2$ *PFDA*	%	130	125	120	130	137
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	136	137	136	143	140
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	119	112	104	126	127
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	90	90	87	91	87
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	90	90	60	85	97
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	94	95	68	86	100
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	97	94	68	88	98
Extracted ISTD $^{13}C_8$ *FOSA*	%	97	89	92	94	93
Extracted ISTD d_3 *N MeFOSA*	%	98	96	94	98	96
Extracted ISTD d_5 *N EtFOSA*	%	103	101	99	106	101
Extracted ISTD d_7 *N MeFOSE*	%	102	97	93	100	97
Extracted ISTD d_9 *N EtFOSE*	%	100	97	101	107	105
Extracted ISTD d_3 *N MeFOSAA*	%	120	105	95	116	121
Extracted ISTD d_5 *N EtFOSAA*	%	109	111	86	102	110
Total Positive PFHxS & PFOS	µg/L	0.04	0.01	<0.01	0.05	<0.01
Total Positive PFOA & PFOS	µg/L	0.04	0.02	<0.01	0.03	<0.01
Total Positive PFAS	µg/L	0.06	0.19	<0.01	0.09	0.01

Dissolved Gases in Water						
Our Reference		321845-1	321845-2	321845-3	321845-4	321845-5
Your Reference	UNITS	SMW_BH009	SMW_BH009_S	SMW_BH035	SMW_BH035_S	SMW_BH038
Date Sampled		27/04/2023	27/04/2023	27/04/2023	27/04/2023	27/04/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	01/05/2023	01/05/2023	01/05/2023	01/05/2023	01/05/2023
Date analysed	-	01/05/2023	01/05/2023	01/05/2023	01/05/2023	01/05/2023
Methane	µg/L	<5	5	<5	<5	<5

Method ID	Methodology Summary
AT-006	Dissolved gases determined by GC-FID based on draft method USEPA SOP RSK175
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			27/04/2023	[NT]	[NT]	[NT]	[NT]	27/04/2023	[NT]
Date analysed	-			27/04/2023	[NT]	[NT]	[NT]	[NT]	27/04/2023	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	93	[NT]	[NT]	[NT]	[NT]	94	[NT]
Surrogate toluene-d8	%		Org-023	94	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			27/04/2023	[NT]	[NT]	[NT]	[NT]	27/04/2023	[NT]
Date analysed	-			27/04/2023	[NT]	[NT]	[NT]	[NT]	27/04/2023	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	118	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	118	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	118	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	93	[NT]	[NT]	[NT]	[NT]	94	[NT]
Surrogate toluene-d8	%		Org-023	94	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/05/2023	1	02/05/2023	02/05/2023		02/05/2023	[NT]
Date analysed	-			02/05/2023	1	03/05/2023	03/05/2023		02/05/2023	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	<50	<50	0	101	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	<100	0	107	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	100	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	<50	<50	0	101	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	<100	0	107	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	100	[NT]
Surrogate o-Terphenyl	%		Org-020	84	1	75	63	17	83	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/05/2023	1	02/05/2023	02/05/2023		02/05/2023	[NT]
Date analysed	-			02/05/2023	1	02/05/2023	02/05/2023		02/05/2023	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	74	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	77	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	79	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	67	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	108	1	82	74	10	103	[NT]

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	321845-2
Date prepared	-			28/04/2023	1	28/04/2023	28/04/2023		28/04/2023	28/04/2023
Date analysed	-			28/04/2023	1	28/04/2023	28/04/2023		28/04/2023	28/04/2023
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	92	92
Boron-Dissolved	µg/L	20	Metals-022	<20	1	100	100	0	105	97
Barium-Dissolved	µg/L	1	Metals-022	<1	1	52	51	2	100	#
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	1	<0.5	<0.5	0	90	95
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	94	96
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	97	101
Copper-Dissolved	µg/L	1	Metals-022	<1	1	6	6	0	97	98
Cobalt-Dissolved	µg/L	1	Metals-022	<1	1	1	1	0	99	101
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	[NT]		112	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	1	230	220	4	96	99
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	1	1	1	0	95	98
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	5	5	0	98	98
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	101	93
Antimony-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	84	97
Selenium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	88	93
Tin-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	100	95
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	44	43	2	96	88
Iron-Dissolved	µg/L	10	Metals-022	<10	1	<10	<10	0	93	#

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			01/05/2023	1	01/05/2023	01/05/2023		01/05/2023	[NT]
Date analysed	-			01/05/2023	1	01/05/2023	01/05/2023		01/05/2023	[NT]
Arsenic-Total	µg/L	1	Metals-022	<1	1	3	3	0	107	[NT]
Boron-Total	µg/L	20	Metals-022	<20	1	100	100	0	100	[NT]
Barium-Total	µg/L	1	Metals-022	<1	1	770	760	1	103	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	<0.5	1	1	1	0	101	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	110	[NT]
Chromium-Total	µg/L	1	Metals-022	<1	1	24	19	23	108	[NT]
Copper-Total	µg/L	1	Metals-022	<1	1	20	20	0	107	[NT]
Cobalt-Total	µg/L	1	Metals-022	<1	1	15	15	0	106	[NT]
Mercury-Total	µg/L	0.05	Metals-021	<0.05	1	0.1	0.07	35	101	[NT]
Manganese-Total	µg/L	5	Metals-022	<5	1	930	900	3	108	[NT]
Molybdenum-Total	µg/L	1	Metals-022	<1	1	3	3	0	109	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	1	15	12	22	107	[NT]
Lead-Total	µg/L	1	Metals-022	<1	1	11	11	0	108	[NT]
Antimony-Total	µg/L	1	Metals-022	<1	1	<1	<1	0	115	[NT]
Selenium-Total	µg/L	1	Metals-022	<1	1	<1	<1	0	106	[NT]
Tin-Total	µg/L	1	Metals-022	<1	1	<1	<1	0	113	[NT]
Zinc-Total	µg/L	1	Metals-022	<1	1	61	60	2	110	[NT]
Iron-Total	µg/L	10	Metals-022	<10	1	4200	4100	2	112	[NT]

QUALITY CONTROL: Metals in Waters - Total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			01/05/2023	[NT]	[NT]	[NT]	[NT]	01/05/2023	[NT]
Date analysed	-			01/05/2023	[NT]	[NT]	[NT]	[NT]	01/05/2023	[NT]
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	84	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	321845-2
Date prepared	-			27/04/2023	1	27/04/2023	27/04/2023		27/04/2023	27/04/2023
Date analysed	-			27/04/2023	1	27/04/2023	27/04/2023		27/04/2023	27/04/2023
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	<0.005	<0.005	0	106	72
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.02	0.02	0	107	101
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	1	0.1	0.1	0	91	83

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	321845-2
Date prepared	-			27/04/2023	1	27/04/2023	27/04/2023		27/04/2023	27/04/2023
Date analysed	-			27/04/2023	1	27/04/2023	27/04/2023		27/04/2023	27/04/2023
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	45	45	0	106	#
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	4	4	0	107	105
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	99	99	0	88	#
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	13	13	0	101	107
Hardness	mgCaCO 3 /L	3	Metals-020	[NT]	1	170	160	6	[NT]	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	240	240	0	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	240	240	0	94	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	60	60	0	113	116
Chloride, Cl	mg/L	1	Inorg-081	<1	1	90	90	0	109	#
Ionic Balance	%		Inorg-040	[NT]	1	-5.0	-6.0	-18	[NT]	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			28/04/2023	[NT]	[NT]	[NT]	[NT]	28/04/2023	[NT]
Date analysed	-			28/04/2023	[NT]	[NT]	[NT]	[NT]	28/04/2023	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	95	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	91	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	107	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	70	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	108	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	97	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	114	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	101	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	115	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	81	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	79	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	107	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	107	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	119	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	113	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	122	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	128	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	107	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	107	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	111	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	109	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	131	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	92	[NT]	[NT]	[NT]	[NT]	93	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	106	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	89	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	96	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	93	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	96	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	112	[NT]	[NT]	[NT]	[NT]	105	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	134	[NT]	[NT]	[NT]	[NT]	123	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	133	[NT]	[NT]	[NT]	[NT]	132	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	122	[NT]	[NT]	[NT]	[NT]	111	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	88	[NT]	[NT]	[NT]	[NT]	86	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	85	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	92	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	92	[NT]	[NT]	[NT]	[NT]	106	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	96	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	105	[NT]	[NT]	[NT]	[NT]	97	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	111	[NT]	[NT]	[NT]	[NT]	111	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	107	[NT]	[NT]	[NT]	[NT]	113	[NT]

QUALITY CONTROL: Dissolved Gases in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			01/05/2023	1	01/05/2023	01/05/2023		01/05/2023	[NT]
Date analysed	-			01/05/2023	1	01/05/2023	01/05/2023		01/05/2023	[NT]
Methane	µg/L	5	AT-006	<5	1	<5	<5	0	108	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

All metals in water-dissolved - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Ion Balance - # Percent recovery is not applicable due to the high concentration of the element/s and/or analyte/s in the sample/s. However an acceptable recovery was obtained for the LCS.

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CERTIFICATE OF ANALYSIS 320601

Client Details

Client	CTP AFJV
Attention	[redacted]
Address	7 Figtree Dr, SYDNEY OLYMPIC PARK, NSW, 2127

Sample Details

Your Reference	**CTP Groundwater Monitoring**
Number of Samples	1 Water
Date samples received	11/04/2023
Date completed instructions received	11/04/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	18/04/2023
Date of Issue	18/04/2023

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Results Approved By
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Nancy Zhang, Laboratory Manager

VOCs in water		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date extracted	-	11/04/2023
Date analysed	-	12/04/2023
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	<1
Bromochloromethane	µg/L	<1
Chloroform	µg/L	<1
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Cyclohexane	µg/L	<1
Carbon tetrachloride	µg/L	<1
Benzene	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	<1
Bromodichloromethane	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
Toluene	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Ethylbenzene	µg/L	<1

VOCs in water		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Bromoform	µg/L	<1
m+p-xylene	µg/L	<2
Styrene	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
o-xylene	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Isopropylbenzene	µg/L	<1
Bromobenzene	µg/L	<1
n-propyl benzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3,5-trimethyl benzene	µg/L	<1
Tert-butyl benzene	µg/L	<1
1,2,4-trimethyl benzene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
Sec-butyl benzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
4-isopropyl toluene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
n-butyl benzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	112
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	105

vTRH(C6-C10)/BTEXN in Water		
Our Reference	UNITS	320601-1
Your Reference		S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date extracted	-	11/04/2023
Date analysed	-	12/04/2023
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	112
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	105

svTRH (C10-C40) in Water		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date extracted	-	12/04/2023
Date analysed	-	13/04/2023
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	100
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	150
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	150
Surrogate o-Terphenyl	%	95

All metals in water-dissolved		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date prepared	-	12/04/2023
Date analysed	-	12/04/2023
Arsenic-Dissolved	µg/L	<1
Boron-Dissolved	µg/L	<20
Barium-Dissolved	µg/L	16
Beryllium-Dissolved	µg/L	<0.5
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	6
Cobalt-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Manganese-Dissolved	µg/L	<5
Molybdenum-Dissolved	µg/L	1
Nickel-Dissolved	µg/L	2
Lead-Dissolved	µg/L	<1
Antimony-Dissolved	µg/L	<1
Selenium-Dissolved	µg/L	<1
Tin-Dissolved	µg/L	<1
Zinc-Dissolved	µg/L	13
Iron-Dissolved	µg/L	<10

PAHs in Water		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date extracted	-	17/04/2023
Date analysed	-	17/04/2023
Naphthalene	µg/L	<0.2
Acenaphthylene	µg/L	<0.1
Acenaphthene	µg/L	<0.1
Fluorene	µg/L	<0.1
Phenanthrene	µg/L	<0.1
Anthracene	µg/L	<0.1
Fluoranthene	µg/L	<0.1
Pyrene	µg/L	<0.1
Benzo(a)anthracene	µg/L	<0.1
Chrysene	µg/L	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2
Benzo(a)pyrene	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5
Total +ve PAH's	µg/L	<0.1
Surrogate p-Terphenyl-d14	%	105

All metals in water - total		
Our Reference	UNITS	320601-1
Your Reference		S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date prepared	-	12/04/2023
Date analysed	-	12/04/2023
Arsenic-Total	µg/L	<1
Boron-Total	µg/L	<20
Barium-Total	µg/L	94
Beryllium-Total	µg/L	<0.5
Cadmium-Total	µg/L	<0.1
Chromium-Total	µg/L	25
Copper-Total	µg/L	15
Cobalt-Total	µg/L	1
Mercury-Total	µg/L	<0.05
Manganese-Total	µg/L	48
Antimony-Total	µg/L	<1
Molybdenum-Total	µg/L	2
Nickel-Total	µg/L	15
Lead-Total	µg/L	4
Selenium-Total	µg/L	<1
Tin-Total	µg/L	<1
Zinc-Total	µg/L	84
Iron-Total	µg/L	1,700

Metals in Waters - Total		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date prepared	-	12/04/2023
Date analysed	-	12/04/2023
Phosphorus - Total	mg/L	0.06

Miscellaneous Inorganics		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date prepared	-	11/04/2023
Date analysed	-	11/04/2023
Ammonia as N in water	mg/L	0.069
Nitrate as N in water	mg/L	0.18
Total Nitrogen in water	mg/L	0.5
Hexavalent Chromium, Cr^{6+}	mg/L	<0.005
Trivalent Chromium, Cr^{3+}	mg/L	0.024

Ion Balance		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date prepared	-	11/04/2023
Date analysed	-	11/04/2023
Calcium - Dissolved	mg/L	17
Potassium - Dissolved	mg/L	1
Sodium - Dissolved	mg/L	5
Magnesium - Dissolved	mg/L	0.7
Hardness	mgCaCO 3 /L	45
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	40
Carbonate Alkalinity as $CaCO_3$	mg/L	<5
Total Alkalinity as $CaCO_3$	mg/L	40
Sulphate, SO4	mg/L	20
Chloride, Cl	mg/L	8
Ionic Balance	%	-12

PFAS in Waters Extended		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date prepared	-	12/04/2023
Date analysed	-	12/04/2023
Perfluorobutanesulfonic acid	µg/L	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02
Perfluorobutanoic acid	µg/L	<0.02
Perfluoropentanoic acid	µg/L	<0.02
Perfluorohexanoic acid	µg/L	<0.01
Perfluoroheptanoic acid	µg/L	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01
Perfluorononanoic acid	µg/L	<0.01
Perfluorodecanoic acid	µg/L	<0.02
Perfluoroundecanoic acid	µg/L	<0.02
Perfluorododecanoic acid	µg/L	<0.05
Perfluorotridecanoic acid	µg/L	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5
4:2 FTS	µg/L	<0.01
6:2 FTS	µg/L	<0.01
8:2 FTS	µg/L	<0.02
10:2 FTS	µg/L	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	99
Surrogate $^{13}C_2$ *PFOA*	%	83
Extracted ISTD $^{13}C_3$ *PFBS*	%	90
Extracted ISTD $^{18}O_2$ *PFHxS*	%	88
Extracted ISTD $^{13}C_4$ *PFOS*	%	109
Extracted ISTD $^{13}C_4$ *PFBA*	%	80

PFAS in Waters Extended		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	98
Extracted ISTD $^{13}C_2$ *PFHxA*	%	109
Extracted ISTD $^{13}C_4$ *PFHpA*	%	96
Extracted ISTD $^{13}C_4$ *PFOA*	%	103
Extracted ISTD $^{13}C_5$ *PFNA*	%	100
Extracted ISTD $^{13}C_2$ *PFDA*	%	88
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	98
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	110
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	74
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	132
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	146
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	146
Extracted ISTD $^{13}C_8$ *FOSA*	%	106
Extracted ISTD d_3 *N MeFOSA*	%	96
Extracted ISTD d_5 *N EtFOSA*	%	97
Extracted ISTD d_7 *N MeFOSE*	%	93
Extracted ISTD d_9 *N EtFOSE*	%	109
Extracted ISTD d_3 *N MeFOSAA*	%	153
Extracted ISTD d_5 *N EtFOSAA*	%	127
Total Positive PFHxS & PFOS	µg/L	<0.01
Total Positive PFOA & PFOS	µg/L	<0.01
Total Positive PFAS	µg/L	<0.01

Dissolved Gases in Water		
Our Reference		320601-1
Your Reference	UNITS	S58_d
Date Sampled		11/04/2023
Type of sample		Water
Date prepared	-	18/04/2023
Date analysed	-	18/04/2023
Methane	µg/L	<5

Method ID	Methodology Summary
AT-006	Dissolved gases determined by GC-FID based on draft method USEPA SOP RSK175
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-024	Hexavalent Chromium (Cr6+) - determined colourimetrically. Waters samples are filtered on receipt prior to analysis.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			11/04/2023	[NT]	[NT]	[NT]	[NT]	11/04/2023	[NT]
Date analysed	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	111	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate toluene-d8	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate 4-BFB	%		Org-023	107	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			11/04/2023	[NT]	[NT]	[NT]	[NT]	11/04/2023	[NT]
Date analysed	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	115	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	115	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	118	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	111	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate toluene-d8	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate 4-BFB	%		Org-023	107	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	320601-1
Date extracted	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	12/04/2023
Date analysed	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	13/04/2023
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	105	103
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	111	96
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	83
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	105	103
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	111	96
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	83
Surrogate o-Terphenyl	%		Org-020	69	[NT]	[NT]	[NT]	[NT]	85	87

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
Date analysed	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Boron-Dissolved	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	82	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	87	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	89	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	91	[NT]
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Antimony-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Tin-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	83	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			17/04/2023	[NT]	[NT]	[NT]	[NT]	17/04/2023	[NT]
Date analysed	-			17/04/2023	[NT]	[NT]	[NT]	[NT]	17/04/2023	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	102	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	96	[NT]	[NT]	[NT]	[NT]	112	[NT]

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	320601-1
Date prepared	-			12/04/2023	1	12/04/2023	12/04/2023		12/04/2023	12/04/2023
Date analysed	-			12/04/2023	1	12/04/2023	12/04/2023		12/04/2023	12/04/2023
Arsenic-Total	µg/L	1	Metals-022	<1	1	<1	<1	0	97	[NT]
Boron-Total	µg/L	20	Metals-022	<20	1	<20	<20	0	105	[NT]
Barium-Total	µg/L	1	Metals-022	<1	1	94	95	1	100	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	<0.5	1	<0.5	<0.5	0	96	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	95	[NT]
Chromium-Total	µg/L	1	Metals-022	<1	1	25	30	18	102	[NT]
Copper-Total	µg/L	1	Metals-022	<1	1	15	17	12	101	[NT]
Cobalt-Total	µg/L	1	Metals-022	<1	1	1	1	0	99	[NT]
Mercury-Total	µg/L	0.05	Metals-021	<0.05	1	<0.05	[NT]		100	80
Manganese-Total	µg/L	5	Metals-022	<5	1	48	56	15	102	[NT]
Antimony-Total	µg/L	1	Metals-022	<1	1	<1	<1	0	97	[NT]
Molybdenum-Total	µg/L	1	Metals-022	<1	1	2	3	40	100	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	1	15	18	18	101	[NT]
Lead-Total	µg/L	1	Metals-022	<1	1	4	5	22	95	[NT]
Selenium-Total	µg/L	1	Metals-022	<1	1	<1	<1	0	94	[NT]
Tin-Total	µg/L	1	Metals-022	<1	1	<1	<1	0	97	[NT]
Zinc-Total	µg/L	1	Metals-022	<1	1	84	100	17	98	[NT]
Iron-Total	µg/L	10	Metals-022	<10	1	1700	2000	16	103	[NT]

QUALITY CONTROL: Metals in Waters - Total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
Date analysed	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			11/04/2023	[NT]	[NT]	[NT]	[NT]	11/04/2023	[NT]
Date analysed	-			11/04/2023	[NT]	[NT]	[NT]	[NT]	11/04/2023	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	[NT]	[NT]	106	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	[NT]	[NT]	97	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Hexavalent Chromium, Cr^{6+}	mg/L	0.005	Inorg-024	<0.005	[NT]	[NT]	[NT]	[NT]	112	[NT]
Trivalent Chromium, Cr^{3+}	mg/L	0.005	Inorg-024	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: Ion Balance					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			11/04/2023	[NT]	[NT]	[NT]	[NT]	11/04/2023	[NT]
Date analysed	-			11/04/2023	[NT]	[NT]	[NT]	[NT]	11/04/2023	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	95	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	95	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	91	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	93	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	[NT]	[NT]	[NT]	[NT]	101	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
Date analysed	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	110	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	104	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	101	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	99	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	84	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	115	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	101	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	89	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	119	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	128	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	96	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	99	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	79	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	130	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	116	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	102	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	120	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	123	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	117	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	108	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	111	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	132	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	87	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	94	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	79	[NT]	[NT]	[NT]	[NT]	84	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	85	[NT]	[NT]	[NT]	[NT]	90	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	84	[NT]	[NT]	[NT]	[NT]	90	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	114	[NT]	[NT]	[NT]	[NT]	106	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	94	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	91	[NT]	[NT]	[NT]	[NT]	93	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	101	[NT]	[NT]	[NT]	[NT]	102	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	94	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	107	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	91	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	93	[NT]	[NT]	[NT]	[NT]	89	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	111	[NT]	[NT]	[NT]	[NT]	106	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	68	[NT]	[NT]	[NT]	[NT]	54	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	106	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	113	[NT]	[NT]	[NT]	[NT]	114	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	129	[NT]	[NT]	[NT]	[NT]	128	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	107	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	91	[NT]	[NT]	[NT]	[NT]	91	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	90	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	91	[NT]	[NT]	[NT]	[NT]	89	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	102	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	139	[NT]	[NT]	[NT]	[NT]	136	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	120	[NT]	[NT]	[NT]	[NT]	126	[NT]

QUALITY CONTROL: Dissolved Gases in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			18/04/2023	1	18/04/2023	18/04/2023		18/04/2023	[NT]
Date analysed	-			18/04/2023	1	18/04/2023	18/04/2023		18/04/2023	[NT]
Methane	µg/L	5	AT-006	<5	1	<5	<5	0	110	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

PFAS: For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

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CERTIFICATE OF ANALYSIS 324413

Client Details

Client	CTP AFJV
Attention	[redacted]
Address	7 Figtree Dr, SYDNEY OLYMPIC PARK, NSW, 2127

Sample Details

Your Reference	**CTP Groundwater Monitoring**
Number of Samples	5 Water
Date samples received	30/05/2023
Date completed instructions received	30/05/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	06/06/2023
Date of Issue	06/06/2023

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Dragana Tomas, Senior Chemist
Kyle Gavrily, Senior Chemist
Loren Bardwell, Development Chemist
Phalak Inthakesone, Organics Development Manager, Sydney
Priya Samarawickrama, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

VOCs in water						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Date analysed	-	01/06/2023	01/06/2023	01/06/2023	01/06/2023	01/06/2023
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1

VOCs in water						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Bromoform	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	100	111	100	109	122
Surrogate toluene-d8	%	99	115	102	104	114
Surrogate 4-BFB	%	97	104	98	99	104

vTRH(C6-C10)/BTEXN in Water						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Date analysed	-	01/06/2023	01/06/2023	01/06/2023	01/06/2023	01/06/2023
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	100	111	100	109	122
Surrogate toluene-d8	%	99	115	102	104	114
Surrogate 4-BFB	%	97	104	98	99	104

svTRH (C10-C40) in Water						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Date analysed	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	64	79	70	81	70

PAHs in Water						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Date analysed	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	75	78	94	87	76

All metals in water-dissolved						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Date analysed	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Arsenic-Dissolved	µg/L	<1	<1	<1	<1	<1
Boron-Dissolved	µg/L	70	<20	<20	70	50
Barium-Dissolved	µg/L	53	650	110	41	3,100
Beryllium-Dissolved	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	0.1	<0.1
Chromium-Dissolved	µg/L	<1	57	13	<1	<1
Copper-Dissolved	µg/L	2	8	5	1	1
Cobalt-Dissolved	µg/L	7	3	<1	39	4
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese-Dissolved	µg/L	980	<5	<5	2,900	250
Molybdenum-Dissolved	µg/L	3	42	7	1	1
Nickel-Dissolved	µg/L	4	3	<1	35	12
Lead-Dissolved	µg/L	<1	1	<1	<1	<1
Antimony-Dissolved	µg/L	<1	1	1	<1	<1
Selenium-Dissolved	µg/L	<1	<1	<1	<1	<1
Tin-Dissolved	µg/L	<1	<1	<1	<1	<1
Zinc-Dissolved	µg/L	16	22	3	190	13
Iron-Dissolved	µg/L	<10	180	<10	1,900	<10

All metals in water - total						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Date analysed	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Arsenic-Total	µg/L	5	<1	<1	18	1
Boron-Total	µg/L	80	<20	20	70	60
Barium-Total	µg/L	990	650	120	890	6,800
Beryllium-Total	µg/L	1	<0.5	<0.5	22	<0.5
Cadmium-Total	µg/L	0.1	<0.1	<0.1	1.0	<0.1
Chromium-Total	µg/L	8	69	29	80	25
Copper-Total	µg/L	36	11	10	420	12
Cobalt-Total	µg/L	17	3	<1	100	5
Mercury-Total	µg/L	0.1	<0.05	<0.05	0.1	<0.05
Manganese-Total	µg/L	1,200	13	15	4,700	250
Molybdenum-Total	µg/L	2	41	7	2	3
Nickel-Total	µg/L	11	11	9	140	32
Lead-Total	µg/L	17	2	1	110	4
Antimony-Total	µg/L	<1	<1	2	<1	<1
Selenium-Total	µg/L	<1	<1	<1	1	<1
Tin-Total	µg/L	<1	<1	<1	3	12
Zinc-Total	µg/L	64	42	17	1,100	74
Iron-Total	µg/L	7,100	440	650	100,000	2,500

Metals in Waters - Total						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Date analysed	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Phosphorus - Total	mg/L	0.55	<0.05	<0.05	2.7	<0.05

Miscellaneous Inorganics						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Date analysed	-	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Ammonia as N in water	mg/L	0.036	0.91	0.007	0.096	1.4
Nitrate as N in water	mg/L	0.02	0.82	0.51	0.13	2.0
Total Nitrogen in water	mg/L	0.2	3.0	1.0	0.5	2.5

Ion Balance						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Date analysed	-	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Calcium - Dissolved	mg/L	37	250	260	37	390
Potassium - Dissolved	mg/L	3	17	3	6.0	40
Sodium - Dissolved	mg/L	87	220	100	450	2,300
Magnesium - Dissolved	mg/L	10	<0.5	<0.5	22	260
Hardness	mgCaCO 3 /L	130	610	660	180	2,000
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	640	440	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	210	<5	<5	100	600
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	57	40	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	210	700	490	100	600
Sulphate, SO4	mg/L	57	<1	260	310	22
Chloride, Cl	mg/L	66	290	140	610	4,000
Ionic Balance	%	-4.0	0	-4.0	-4.0	7.0

PFAS in Waters Extended						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Date analysed	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Perfluorobutanesulfonic acid	µg/L	<0.01	0.05	0.01	<0.01	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	<0.01	0.01	0.03	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	0.02	0.02	<0.01	0.02	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid	µg/L	<0.02	<0.02	0.02	<0.02	<0.02
Perfluorohexanoic acid	µg/L	<0.01	0.01	0.02	0.01	<0.01
Perfluoroheptanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01	0.01	<0.01	0.01	<0.01
Perfluorononanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
6:2 FTS	µg/L	<0.01	0.1	0.01	<0.01	<0.01
8:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
10:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	100	100	102	95	99
Surrogate $^{13}C_2$ *PFOA*	%	104	105	102	110	100
Extracted ISTD $^{13}C_3$ *PFBS*	%	95	98	95	96	94
Extracted ISTD $^{18}O_2$ *PFHxS*	%	100	99	97	99	96
Extracted ISTD $^{13}C_4$ *PFOS*	%	99	97	98	102	97
Extracted ISTD $^{13}C_4$ *PFBA*	%	99	99	97	63	101

PFAS in Waters Extended						
Our Reference		324413-1	324413-2	324413-3	324413-4	324413-5
Your Reference	UNITS	BH009S	BH009D	BH038	BH035S	BH035D
Date Sampled		30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
Type of sample		Water	Water	Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	105	103	105	103	102
Extracted ISTD $^{13}C_2$ *PFHxA*	%	101	103	104	106	99
Extracted ISTD $^{13}C_4$ *PFHpA*	%	99	98	98	96	97
Extracted ISTD $^{13}C_4$ *PFOA*	%	104	101	102	97	105
Extracted ISTD $^{13}C_5$ *PFNA*	%	99	96	99	97	96
Extracted ISTD $^{13}C_2$ *PFDA*	%	106	106	106	108	105
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	108	103	104	107	106
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	100	98	97	87	97
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	71	70	73	64	70
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	105	102	108	102	96
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	107	105	111	95	102
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	119	127	119	122	117
Extracted ISTD $^{13}C_8$ *FOSA*	%	100	97	98	99	102
Extracted ISTD d_3 *N MeFOSA*	%	93	93	93	92	93
Extracted ISTD d_5 *N EtFOSA*	%	91	93	87	86	92
Extracted ISTD d_7 *N MeFOSE*	%	93	94	95	96	95
Extracted ISTD d_9 *N EtFOSE*	%	98	95	96	93	96
Extracted ISTD d_3 *N MeFOSAA*	%	100	93	96	94	95
Extracted ISTD d_5 *N EtFOSAA*	%	104	100	103	104	98
Total Positive PFHxS & PFOS	µg/L	0.03	0.02	0.01	0.04	<0.01
Total Positive PFOA & PFOS	µg/L	0.02	0.03	<0.01	0.03	<0.01
Total Positive PFAS	µg/L	0.03	0.19	0.08	0.07	<0.01

Method ID	Methodology Summary
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	[NT]
Date analysed	-			01/06/2023	1	01/06/2023	01/06/2023		01/06/2023	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	112	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	1	<1	<1	0	120	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	116	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	119	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	99	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	109	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	104	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	108	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	118	1	100	111	10	112	[NT]
Surrogate toluene-d8	%		Org-023	112	1	99	109	10	109	[NT]
Surrogate 4-BFB	%		Org-023	103	1	97	103	6	104	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	[NT]
Date analysed	-			01/06/2023	1	01/06/2023	01/06/2023		01/06/2023	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	<10	<10	0	107	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	<10	<10	0	107	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	101	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	117	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	102	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	108	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	106	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	118	1	100	111	10	112	[NT]
Surrogate toluene-d8	%		Org-023	112	1	99	109	10	109	[NT]
Surrogate 4-BFB	%		Org-023	103	1	97	103	6	104	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	324413-2
Date extracted	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
Date analysed	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	<50	<50	0	105	112
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	<100	0	106	107
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	107	110
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	<50	<50	0	105	112
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	<100	0	106	107
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	107	110
Surrogate o-Terphenyl	%		Org-020	105	1	64	64	0	107	79

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	324413-3
Date extracted	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
Date analysed	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
Naphthalene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	77	88
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	78	91
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	73	87
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	73	86
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	79	92
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	98
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	95
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	88
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	99	1	75	62	19	96	78

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	324413-2
Date prepared	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
Date analysed	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	91	90
Boron-Dissolved	µg/L	20	Metals-022	<20	1	70	80	13	90	79
Barium-Dissolved	µg/L	1	Metals-022	<1	1	53	52	2	93	#
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	1	<0.5	<0.5	0	86	84
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	95	91
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	91	81
Copper-Dissolved	µg/L	1	Metals-022	<1	1	2	2	0	89	85
Cobalt-Dissolved	µg/L	1	Metals-022	<1	1	7	7	0	87	84
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	95	84
Manganese-Dissolved	µg/L	5	Metals-022	<5	1	980	970	1	93	92
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	1	3	3	0	89	83
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	4	4	0	92	88
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	97	87
Antimony-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	101	88
Selenium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	92	87
Tin-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	94	91
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	16	14	13	88	85
Iron-Dissolved	µg/L	10	Metals-022	<10	1	<10	<10	0	90	#

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	324413-2
Date prepared	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
Date analysed	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
Arsenic-Total	µg/L	1	Metals-022	<1	1	5	[NT]		88	[NT]
Boron-Total	µg/L	20	Metals-022	<20	1	80	[NT]		92	[NT]
Barium-Total	µg/L	1	Metals-022	<1	1	990	[NT]		93	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	<0.5	1	1	[NT]		83	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	1	0.1	[NT]		94	[NT]
Chromium-Total	µg/L	1	Metals-022	<1	1	8	[NT]		91	[NT]
Copper-Total	µg/L	1	Metals-022	<1	1	36	[NT]		88	[NT]
Cobalt-Total	µg/L	1	Metals-022	<1	1	17	[NT]		86	[NT]
Mercury-Total	µg/L	0.05	Metals-021	<0.05	1	0.1	0.2	67	111	110
Manganese-Total	µg/L	5	Metals-022	<5	1	1200	[NT]		93	[NT]
Molybdenum-Total	µg/L	1	Metals-022	<1	1	2	[NT]		93	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	1	11	[NT]		91	[NT]
Lead-Total	µg/L	1	Metals-022	<1	1	17	[NT]		98	[NT]
Antimony-Total	µg/L	1	Metals-022	<1	1	<1	[NT]		92	[NT]
Selenium-Total	µg/L	1	Metals-022	<1	1	<1	[NT]		90	[NT]
Tin-Total	µg/L	1	Metals-022	<1	1	<1	[NT]		97	[NT]
Zinc-Total	µg/L	1	Metals-022	<1	1	64	[NT]		85	[NT]
Iron-Total	µg/L	10	Metals-022	<10	1	7100	[NT]		98	[NT]

QUALITY CONTROL: All metals in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	4	31/05/2023	31/05/2023		[NT]	[NT]
Date analysed	-			[NT]	4	31/05/2023	31/05/2023		[NT]	[NT]
Arsenic-Total	µg/L	1	Metals-022	[NT]	4	18	[NT]		[NT]	[NT]
Boron-Total	µg/L	20	Metals-022	[NT]	4	70	[NT]		[NT]	[NT]
Barium-Total	µg/L	1	Metals-022	[NT]	4	890	[NT]		[NT]	[NT]
Beryllium-Total	µg/L	0.5	Metals-022	[NT]	4	22	[NT]		[NT]	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	[NT]	4	1.0	[NT]		[NT]	[NT]
Chromium-Total	µg/L	1	Metals-022	[NT]	4	80	[NT]		[NT]	[NT]
Copper-Total	µg/L	1	Metals-022	[NT]	4	420	[NT]		[NT]	[NT]
Cobalt-Total	µg/L	1	Metals-022	[NT]	4	100	[NT]		[NT]	[NT]
Mercury-Total	µg/L	0.05	Metals-021	[NT]	4	0.1	0.1	0	[NT]	[NT]
Manganese-Total	µg/L	5	Metals-022	[NT]	4	4700	[NT]		[NT]	[NT]
Molybdenum-Total	µg/L	1	Metals-022	[NT]	4	2	[NT]		[NT]	[NT]
Nickel-Total	µg/L	1	Metals-022	[NT]	4	140	[NT]		[NT]	[NT]
Lead-Total	µg/L	1	Metals-022	[NT]	4	110	[NT]		[NT]	[NT]
Antimony-Total	µg/L	1	Metals-022	[NT]	4	<1	[NT]		[NT]	[NT]
Selenium-Total	µg/L	1	Metals-022	[NT]	4	1	[NT]		[NT]	[NT]
Tin-Total	µg/L	1	Metals-022	[NT]	4	3	[NT]		[NT]	[NT]
Zinc-Total	µg/L	1	Metals-022	[NT]	4	1100	[NT]		[NT]	[NT]
Iron-Total	µg/L	10	Metals-022	[NT]	4	100000	[NT]		[NT]	[NT]

QUALITY CONTROL: Metals in Waters - Total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	[NT]
Date analysed	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	[NT]
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	1	0.55	0.54	2	100	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			30/05/2023	[NT]	[NT]	[NT]	[NT]	30/05/2023	[NT]
Date analysed	-			30/05/2023	[NT]	[NT]	[NT]	[NT]	30/05/2023	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	[NT]	[NT]	101	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	[NT]	[NT]	102	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	324413-2
Date prepared	-			30/05/2023	1	30/05/2023	30/05/2023		30/05/2023	30/05/2023
Date analysed	-			30/05/2023	1	30/05/2023	30/05/2023		30/05/2023	30/05/2023
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	37	39	5	87	#
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	3	3	0	85	77
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	87	91	4	87	#
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	10	10	0	85	79
Hardness	mgCaCO 3 /L	3	Metals-020	[NT]	1	130	140	7	[NT]	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	210	[NT]		[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	[NT]		[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	210	[NT]		99	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	57	[NT]		113	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	66	[NT]		106	[NT]
Ionic Balance	%		Inorg-040	[NT]	1	-4.0	[NT]		[NT]	[NT]

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	5	30/05/2023	30/05/2023		[NT]	[NT]
Date analysed	-			[NT]	5	30/05/2023	30/05/2023		[NT]	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	[NT]	5	390	[NT]		[NT]	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	[NT]	5	40	[NT]		[NT]	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	[NT]	5	2300	[NT]		[NT]	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	[NT]	5	260	[NT]		[NT]	[NT]
Hardness	mgCaCO 3 /L	3	Metals-020	[NT]	5	2000	[NT]		[NT]	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	[NT]	5	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	5	600	[NT]		[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	5	<5	[NT]		[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	5	600	[NT]		[NT]	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	[NT]	5	22	21	5	[NT]	[NT]
Chloride, Cl	mg/L	1	Inorg-081	[NT]	5	4000	3800	5	[NT]	[NT]
Ionic Balance	%		Inorg-040	[NT]	5	7.0	[NT]		[NT]	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	[NT]
Date analysed	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	104	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	105	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	1	0.01	<0.01	0	100	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	102	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	1	0.02	0.01	67	104	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	91	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	102	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	101	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	102	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	99	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	103	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	106	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	100	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	99	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	99	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	82	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	101	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	97	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	97	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	105	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	95	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	112	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	109	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	99	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	94	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	93	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	104	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	101	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	99	1	100	100	0	99	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	104	1	104	103	1	108	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	96	1	95	94	1	93	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	97	1	100	98	2	99	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	98	1	99	96	3	98	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	103	1	99	96	3	102	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	105	1	105	103	2	101	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	102	1	101	104	3	101	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	98	1	99	96	3	95	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	103	1	104	101	3	98	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	98	1	99	97	2	95	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	105	1	106	106	0	105	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	110	1	108	106	2	102	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	99	1	100	97	3	97	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	67	1	71	66	7	68	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	105	1	105	108	3	98	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	108	1	107	102	5	101	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	120	1	119	117	2	111	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	102	1	100	99	1	94	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	95	1	93	91	2	90	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	92	1	91	89	2	73	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	95	1	93	93	0	93	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	97	1	98	98	0	94	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	99	1	100	100	0	95	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	105	1	104	104	0	101	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

All metals in water-dissolved - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

Ion Balance - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

APPENDIX E - WTP SAMPLING AND DISCHARGE REGISTER

The Bays WTP Sampling and Discharge Summary

																			Check UoM	Check UoM	Check UoM			Check UoM	
					Sampling	pH	Turbidity	Oil and Grease	Hydrocarbons TRH (C6-C9)	Aluminium	Arsenic	Cadmium	Chromium (VI) Compounds	Cobalt	Copper	Iron	Lead	Manganese	Nickel	Zinc	Ammonia	Nitrate + nitrite (oxidised nitrogen)	Nitrogen (total)	Perfluorooctane sulphonate (PFOS)	Phosphorus (total)	
					UoM	Lab	Lab	Visual	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	
					WPIA Criteria	pH units	TSS (Lab)	Y/N	ug/L	ug/l	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Sample Date	Site / WTP	Source Water	Lab ID	Notes	EPL Criteria	6.5-8.5	50		100		90			1	1.3	300		1900	70	8	900	200	700	0.13	1000
						6.5-8.5	15	N	100	55	None	0.7	4.4	1	1.3	300	4.4	80	7	8	910	200	300	0.00023	30
23/01/2023	TBY C-WTP	Untreated	315021	**DAY 1**		10.6	22000	N	38	350	3	0.1	20	1	1	40	1	5	1	2	290	500	1200	0.0062	12000
23/01/2023	TBY C-WTP	Treated	315021	**DAY 1**		7.7	5	N	980	30	1	0.1	1	1	1	10	1	5	1	1	23	8	100	0.0002	300
24/01/2023	TBY C-WTP	Untreated	315204	**DAY 2**		11.7	3000	N	10	480	1	0.1	82	1	3	80	1	5	1	1	300	790	3200	0.0042	2400
24/01/2023	TBY C-WTP	Treated	315204	**DAY 2**		7.3	5	N	220	20	4	0.1	1	1	1	10	1	5	1	1	210	5	400	0.0002	300
25/01/2023	TBY C-WTP	Untreated	315285	**DAY 3**		11.8	780	N	97	840	1	0.1	50	1	2	60	1	5	1	2	300	540	1500	0.004	1600
25/01/2023	TBY C-WTP	Treated	315285	**Day 3**		8	5	N	210	20	2	0.1	1	1	1	30	1	5	1	2	5	300	400	0.0002	200
				Daily sampling period complete. Commence weekly sampling.																					
31/01/2023	TBY C-WTP	Untreated	315429	**Week 1**		11.7	80000	N	100	1000	2	0.1	20	1	5	80	1	5	1	5	220	400	3400	0.01	7700
31/01/2023	TBY C-WTP	Treated	315429	**Week 1** No discharge during this period. Discharge discontinued on 27/01/2023 when preliminary results received for above.		8.5	5	N	200	10	2	0.1	1	1	1	10	1	5	1	6	84	9	200	0.0002	100
01-03/02/2023	TBY C-WTP	Treated	2303527 2303427	**Retest** Samples taken post improvement activities, discharge recommenced 07/02/2023 Note: only targeted sampling		8.07		N	20																60
6/02/2023	TBY C-WTP	Untreated	315815	**Week 2** Sampling of untreated water from inlet line		10.8	43000	N	10	2000	2	0.1	0.001	1	5	50	1	5	1	2	340	300	2600	0.0082	9900
06-07/02/2023	TBY C-WTP	Treated	2304860, 315815	**Week 2**		8.2	5	N	10	10	1	0.1	0.001	1	1	10	1	10	1	1	130	5	200	0.0002	43
15/02/2023	TBY C-WTP	Untreated	316580	**Week 3**		8.6	42000	N	100	10	5	0.1	1	1	1	10	1	26	2	1	84	200	1000	0.0056	4000
15/02/2023	TBY C-WTP	Treated	316580	**Week 3**		7.7	5	N	10	10	1	0.1	1	1	1	10	1	5	1	1	23	5	100	0.0002	200
		Untreated		Sampling of untreated water from mixing tank																					
		Treated		No discharge has occurred. Filtration media replaced, which is likely resulting in increased Phosphorus as a byproduct of the fresh media filtration treatment.																					
20/02/2023	TBY C-WTP	Untreated	317012	**Week 4**		9.9	150000	N	330	60	18	0.1	20	1	4	10	1	5	1	1	190	1400	2000	0.0052	3500
20/02/2023	TBY C-WTP	Treated	317012	**Week 4**		7.5	5	N	45	10	1	0.1	0	1	1	10	1	5	1	1	41	6	100	0.0002	50
				Weekly sampling period complete. Commence fortnightly sampling.																					
28/02/2023	TBY C-WTP	Untreated	317538	**Fortnight 1**		12.1	300	N	42	320	1	0.1	27	1	6	80	1	5	2	1	340	690	3000	0.0089	2200
28/02/2023	TBY C-WTP	Treated	317538	**Fortnight 1**		7.8	5	N	10	10	1	0.1	1	1	1	10	1	7	1	1	340	5	600	0.0002	90
14/03/2023	TBY C-WTP	Untreated	318821	**Fortnight 2**		9.4	2200	N	16	90	3	0.1	31	1	3	30	1	5	1	1	50	700	2300	0.01	970
14/03/2023	TBY C-WTP	Treated	318821	**Fortnight 2**		8.3	5	N	10	10	1	0.1	1	1	1	10	1	5	1	1	130	30	500	0.0002	40
28/03/2023	TBY C-WTP	Untreated	319642	**Fortnight 3**		11.6	82000	N	10	1700	1	0.1	2	3	21	10	1	5	2	4	420	640	1400	0.0083	1400
28/03/2023	TBY C-WTP	Treated	319642	**Fortnight 3**		7.8	5	N	14	10	1	0.1	1	1	1	10	1	6	1	1	74	90	200	0.0002	80
13/04/2023	TBY C-WTP	Untreated	320861	**Fortnight 4**		7.3	590	N	10	10	2	0.1	1	16	1	10	1	540	35	260	780	100	2200	0.0005	270
13/04/2023	TBY C-WTP	Treated	320861	**Fortnight 4**		7.3	5.5	N	10	10	1	0.1	1	1	1	10	1	5	3	1	79	300	300	0.0002	80
1/05/2023	TBY C-WTP	Untreated	322032	**Fortnight 5**		8.2	3300	N	67	20	6	0.1	0.001	1	1	10	1	95	3	2	340	300	110	0.002	860
1/05/2023	TBY C-WTP	Treated	322032	**Fortnight 5**		7.4	20	N	10	10	1	0.1	0.008	1	1	10	1	5	1	1	87	500	40	0.0002	30
17/05/2023	TBY C-WTP	Untreated	323340	**Fortnight 6**		8	3700	N	10	10	1	0.1	1	1	1	30	1	76	5	2	380	300	1600	0.002	1800
17/05/2023	TBY C-WTP	Treated	323340	**Fortnight 6**		7.5	6	N	160	10	1	0.1	1	1	1	20	1	5	1	3	11	40	500	0.0002	40
2/06/2023	TBY C-WTP	Untreated	324758	**Fortnight 7**		10.1	22,000	N	10	160	2	0.1	13	1	2	20	1	5	1	1	180	990	1400	0.019	1000
2/06/2023	TBY C-WTP	Treated	324758	**Fortnight 7**		7.4	14	N	10	10	1	0.1	2	1	1	10	1	5	1	1	160	10	800	0.0002	120

Burwood WTP Sampling and Discharge Summary

																			Check UoM	Check UoM	Check UoM			Check UoM
Sample Date	Site / WTP	Source Water	Lab ID	Notes		pH	Turbidity	Oil and Grease	Hydrocarbons TRH (C6-C9)	Aluminium	Arsenic	Cadmium	Chromium (VI) Compounds	Cobalt	Copper	Iron	Lead	Manganese	Nickel	Zinc	Ammonia	Nitrate + nitrite (oxidised nitrogen)	Nitrogen (total)	Perfluorooctane sulphonate (PFOS)	Phosphorus (total)
					Sampling	Lab	TSS (Lab)	Visual	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
					UoM	pH units	mg/L	Y/N	ug/L	ug/l	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
					WPIA Criteria	6.5-8.5	50		100		90			1	1.3	300		1900	70	8	900	200	700	0.13	1000
					EPL Criteria	6.5-8.5	15	N	100	55	None	0.7	4.4	1	1.3	300	4.4	80	7	8	910	200	300	0.00023	30
25/01/2023	BWD	Untreated	315203	**DAY 2**																				
25/01/2023	BWD	Treated	315203	**DAY 2**		7.7	6	N	110	30	4	0.1	1	1	1	40	1	7	1	5	5	5	300	0.0002	400
31/01/2023	BWD	Untreated	315481	**DAY 3**		7.5	840	N	18	650	17	0.2	0.001	2	1	120	1	360	3	390	0.63	0.45	1200	0.00034	0.2
31/01/2023	BWD	Treated	315481	**Day 3**		7.6	5	N	19	10	2	0.1	1	1	1	10	1	5	1	1	600	5	1900	0.0002	100
				Daily sampling period complete. Commence weekly sampling.																				
22/02/2023	BWD	Untreated		**Week 1**		11.6	29,000	N	10	2600	4	<0.1	32	1	4	40	1	5	1	1	400	700	3400	0.0022	1500
22/02/2023	BWD	Treated		**Week 1**		7.8	5	N	570	10	<1	0.1	1	1	1	10	1	230	1	1	810	5	1800	0.0002	20
26/04/2023	BWD	Untreated	321741	**Week 2**		10.4	140	N	10	40	2	0.1	0.019	1	1	10	1	5	1	2	0.31	0.64	2.5	0.001	90
26/04/2023	BWD	Treated	321741	**Week 2**		7.6	5	N	10	80	2	0.1	0.004	1	1	10	1	100	1	2	0.73	0.01	1.7	0.0002	10
5/05/2023	BWD	Untreated	322493	**Week 3**		11.1	36	N	10	1700	1	0.1	25	1	2	10	1	5	1	3	400	400	1900	0.001	60
5/05/2023	BWD	Treated	322493	**Week 3**		7.7	5	N	10	40	2	0.1	4	1	1	10	1	140	1	2	520	200	800	0.0002	20
22/05/2023	BWD	Untreated	323734	**Week 4**		8.1	33000	N	10	10	32	0.1	7	1	1	10	1	13	2	1	600	300	2200	0.01	2100
22/05/2023	BWD	Treated	323734	**Week 4**		7.2	6	N	10	20	2	0.1	6	1	1	10	1	97	1	7	1200	10	1800	0.0002	20
				Weekly sampling period complete. Commence fortnightly sampling.																				
1/06/2023	BWD	Untreated	324630	**Fortnight 1**		8.5	53000	N	10	20	43	0.1	27	1	1	10	1	7	1	3	510	400	1200	0.01	6800
1/06/2023	BWD	Treated	324630	**Fortnight 1**		7.4	5	N	10	20	1	0.1	2	1	1	10	1	7	1	1	630	90	400	0.0002	10

Five Dock WTP Sampling and Discharge Summary

																			Check UoM	Check UoM	Check UoM			Check UoM	
					pH	Turbidity	Oil and Grease	Hydrocarbons TRH (C6-C9)	Aluminium	Arsenic	Cadmium	Chromium (VI) Compounds	Cobalt	Copper	Iron	Lead	Manganese	Nickel	Zinc	Ammonia	Nitrate + nitrite (oxidised nitrogen)	Nitrogen (total)	Perfluorooctane sulphonate (PFOS)	Phosphorus (total)
				Sampling	Lab	TSS (Lab)	Visual	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
	Site /			UoM	pH units	mg/L	Y/N	ug/L	ug/l	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Sample Date	WTP	Source Water	Lab ID	Notes EPL Criteria	6.5-8.5	15	N	100	55	None	0.7	4.4	1	1.3	300	4.4	80	7	8	910	200	300	0.00023	30
14/04/2023	FDK	Untreated	320899	**DAY 1** Samples from feed of WTP	7.9	1300	N	130	30	4	0.1	0.004	1	1	10	1	2100	3	9	0.005	0.1	0.8	0.0027	1.2
14/04/2023	FDK	Treated	320899	**DAY 1** Samples at outlet of WTP	7.9	12	N	70	10	3	0.1	0.001	1	1	10	1	5	1	2	0.005	0.002	0.1	0.0002	0.22
17/04/2023	FDK	Untreated	320989	**DAY 2** Samples from feed of WTP	7.7	6400	N	10	10	31	0.1	0.001	3	1	10	1	7900	7	2	0.066	0.2	0.8	0.001	0.38
17/04/2023	FDK	Treated	320989	**DAY 2** Samples at outlet of WTP	8.1	5	N	28	10	5	0.1	0.001	1	1	10	1	6	1	1	0.005	0.006	0.1	0.0002	0.19
18/04/2023	FDK	Untreated	321154	**DAY 3** Samples from feed of WTP	9	25000	N	16	20	91	0.1	0.013	1	1	10	1	5	3	1	0.16	0.3	1.4	0.0064	1.9
18/04/2023	FDK	Treated	321154	**DAY 3** Samples at outlet of WTP	7.5	5	N	13	50	3	0.1	0.001	1	1	10	1	17	1	6	0.005	0.005	0.1	0.0002	0.1
				Daily sampling period complete. Commence weekly sampling.																					
26/04/2023	FDK	Untreated	321740	**Week 1**	7.3	80000	N	360	10	14	0.1	0.001	6	1	10	1	140	9	3	0.03	0.03	0.5	0.01	10000
26/04/2023	FDK	Treated	321740	**Week 1**	7.3	5	N	26	10	4	0.1	0.001	1	1	100	1	9	1	5	0.0005	0.005	0.2	0.0002	140
5/05/2023	FDK	Untreated	322492	**Week 2**	7.7	80000	N	100	10	7	0.1	1	24	1	10	1	230	41	8	15000	400	300	0.01	1500
5/05/2023	FDK	Treated	322492	**Week 2**	8.2	5	N	10	10	2	0.1	1	1	1	70	1	5	1	5	5	5	200	0.0002	20
11/05/2023	FDK	Untreated	322924	**Week 3**	7.9	140000	N	1000	30	20	0.1	3	10	1	770	39	90	12	900	180	2000	5800	0.012	4400
11/05/2023	FDK	Treated	322924	**Week 3**	7.7	5	N	16	20	1	0.1	1	1	1	10	1	5	1	1	13	7	900	0.0002	10
16/05/2023	FDK	Untreated	323284	**Week 4**	8.6	1900	N	10	20	44	0.1	9	1	3	10	1	10	7	1	560	730	1800	0.014	440
16/05/2023	FDK	Treated	323284	**Week 4**	7.8	5	N	10	10	4	0.1	3	1	1	10	1	5	1	1	13	5	100	0.0002	20
				Weekly sampling period complete. Commence fortnightly sampling.																					
16/06/2023	FDK	Untreated	325827	**Fortnight 1**	9.2	350	N	26	30	4	0.1	14	1	2	10	1	5	1	2	130	620	1200	0.0041	170
16/06/2023	FDK	Treated	325827	**Fortnight 1**	7.3	5	N	10	10	1	0.1	3	1	1	10	1	5	1	4	64	20	100	0.0002	20

Sydney Olympic Park WTP Sampling and Discharge Summary

Sample Date	Site / WTP	Source Water	Lab ID	Notes	pH	Turbidity	Oil and Grease	Hydrocarbons TRH (C6-C9)	Aluminium	Arsenic	Cadmium	Chromium (VI) Compounds	Cobalt	Copper	Iron	Lead	Manganese	Nickel	Zinc	Ammonia	Nitrate + nitrite (oxidised nitrogen)	Nitrogen (total)	Perfluorooctane sulphonate (PFOS)	Phosphorus (total)
				Sampling	Lab	TSS (Lab)	Visual	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
				UoM	pH units	mg/L	Y/N	ug/L	ug/l	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
				EPL Criteria	6.5-8.5	15	N	100	55	None	0.7	4.4	1	1.3	300	4.4	80	7	8	910	200	300	0.00023	30
17/04/2023	SOP-WTP	Untreated	321048	**DAY 1** Sampling of untreated water from inlet line	8.1	220	N	10	30	4	0.1	1	1	4	60	1	5	2	1	28	40	200	0.14	200
17/04/2023	SOP-WTP	Treated	321048	**DAY 1** Treated water was dischnged into the recycle tank on site.	4	5	N	18	120	1	0.1	1	1	1	30	1	40	4	110	63	10	100	0.0003	10
20/04/2023	SOP-WTP	Untreated	321487	**DAY 2** Sampling of untreated water from inlet line	7.9	830	N	10	150	2	0.1	1	1	2	10	1	26	2	2	640	730	3900	0.031	570
20/04/2023	SOP-WTP	Treated	321487	**DAY 2** Discharged 800L to stormwater	7.5	5	N	10	50	1	0.1	1	1	1	10	1	63	1	3	29	5	100	0.0002	10
26/04/2023	SOP-WTP	Untreated	321736	**DAY 3** Sampling of untreated water from inlet line	7.9	210	N	10	40	3	0.1	1	1	1	10	1	5	1	6	53	29	500	0.02	180
26/04/2023	SOP-WTP	Treated	321736	**Day 3** Discharged to stormwater	7.5	5	N	10	60	1	0.1	1	1	1	10	1	64	1	2	39	5	100	0.0002	10
				Daily sampling period complete. Commence weekly sampling.																				
27/04/2023	SOP-WTP	Untreated	321842	**Week 1** Sampling of untreated water from inlet line	7.8	9400	N	10	30	2	0.1	1	1	3	10	1	35	1	2	160	670	1400	0.014	6800
27/04/2023	SOP-WTP	Treated	321842	**Week 1** Discharged to stormwater	7.6	5	N	10	50	1	0.1	1	1	1	10	1	39	1	2	240	5	100	0.0002	10
1/05/2023	SOP-WTP	Untreated	322050	**Week 2** Sampling of untreated water from inlet line	8.4	1100	N	10	20	27	0.1	1	1	1	10	1	6	1	2	320	4200	5500	0.001	1600
1/05/2023	SOP-WTP	Treated	322050	**Week 2** Discharged to stormwater	7.7	5	N	10	50	1	0.1	29	1	1	10	1	140	2	3	24	5	100	0.0003	10
17/05/2023	SOP-WTP	Untreated	323355	**Week 3**	8.3	5	N	10	20	4	0.1	3	1	3	10	1	6	2	1	17	710	1800	0.013	400
17/05/2023	SOP-WTP	Treated	323355	**Week 3**	7.5	5	N	10	30	11	0.2	1	1	1	10	1	150	2	6	230	5	400	0.0002	60
8/06/2023	SOP-WTP	Untreated	325252	**Week 4**	8.4	5	N	10	50	2	0.1	1	1	3	10	1	7	1	3	58	450	1200	0.0055	380
8/06/2023	SOP-WTP	Treated	325252	**Week 4**	7.9	5	N	10	10	2	0.1	1	1	1	10	1	5	1	4	27	5	100	0.0002	10

ACOUSTICS ADVISOR ENDORSEMENT
SYDNEY METRO WEST (SSI 10038)

Review of	**Central Tunnelling Package:** Bi-Annual Construction Monitoring Report December 2022 – June 2023	**Reviewed document reference:**	AFJV Bi-Annual Construction Monitoring Report – December 2022 – June 2023 SMWSTCTP-AFJ-1NL-EN-RPT-000023 Rev 02 dated 20 March 2024.
Prepared by:	[redacted] Alternate Acoustics Advisor		
Date of issue:	16 April 2024		

As approved Alternate Acoustics Advisor (AA) for the Sydney Metro West project, I reviewed and provided comments on the noise and vibration components of previous revisions of this monitoring report. I am satisfied that the report has been adequately updated to address my comments and, on that basis, I endorse it.

[redacted]

Metro West Alternate Acoustics Advisor